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PRESENT DAY THEORIES OF INTELLECTUAL
FACTORS (GENERAL, GROUP, AND SPECIFIC).*

BY LL. WYNN JONES.

(From the Department of Education, The University, Leeds.)

- I.—*The origin of reference.*
- II.—*The theory of two factors.*
- III.—*Factors as psychological concepts.*
- IV.—*The tetrad difference criterion with illustration.*
- V.—*Thorndike's views.*
- VI.—*Thomson's sampling theory.*
- VII.—*Kelley's researches.*
- VIII.—*Other theories and hypotheses.*

I.—THE ORIGIN OF REFERENCE.

A SURE sign of psychological progress would appear to be the raising of the standard in assessing the importance of a psychological school. Severe demands are made on both its qualitative and quantitative principles, and the excellence of its principles must be matched by that of its measurements. This dual insistence makes it possible to discuss the topics of this paper without referring to the master-minds of antiquity and to regard the origin of reference as the year 1904.

The psychological world was then largely dominated by Wundt. Already for a quarter of a century his creative mind, fortified by encyclopædic knowledge, had been building up psychology as an independent subject. His philosophic skill in dialectic, his psychologic skill in introspection and his mechanical skill in experimentation were then supreme. From his laboratory Spearman published papers which abundantly exhibited these Wundtian traits, but, in addition, they possessed outstanding characteristics of their own for which the inspiration came from the pupil and not from the master. These will be our immediate concern.

*This is the fourth of a series of articles dealing with recent developments in various aspects of educational psychology. Previous articles were: (1) *Modern Trends in Infant Psychology*, Vol. I, Part 2; (2) *Present Tendencies in Vocational Selection*, Vol. I, Part 3; (3) "*Gestalttheorie*": its Significance for Teaching, Vol. II, Part 2.

II.—THE THEORY OF TWO FACTORS.

Spearman's epoch-making contribution was entitled, "*General Intelligence*" *objectively determined and measured*.* As this paper should be known to every student of psychology I have always regretted that the number of copies available in this country is so inadequate. It forced psychologists to study *factors* and abandon *faculties*. Here "Correlational Psychology" is successfully applied in detail for the first time to the study "of the Functional Uniformities which connect the psychics of the Laboratory with those of real Life." This was effected without dethroning introspection as an essential psychological method. For such a programme the Leipzig school was not enthusiastic. Some years before, one of Wundt's early students, J. McKeen Cattell, who has since exercised so profound an influence on psychology in America, obtained little encouragement from Wundt when he suggested the testing of subjects who were not highly trained. Spearman made the momentous discovery that if tests of different abilities were applied to a number of individuals and the results of any four of these tests considered, their intercorrelations tended towards a peculiar arrangement† which could be expressed by a tetrad equation of the form

$$r_{12}r_{34} - r_{13}r_{24} = 0$$

The next step was to ascertain by mathematical analysis what were the relations between the abilities tested. The answer is the Theory of Two Factors: "Whenever the tetrad equation holds throughout any table of correlations, and *only* when it does so, then every individual measurement of every ability can be divided into two independent parts. The one part is the "general factor" *g* which varies freely from individual to individual, but remains the same for any one individual in respect of all the correlated abilities. The second part is the "specific factor" *s* which not only varies from individual to individual, but even for any one individual from each ability to another."‡

Although this paper ultimately caused more discussion than any other before or since, yet it did not apparently cause an immediate upheaval. Mathematicians who were not psychologists were not interested and, in any case, would be liable to flounder in an attempt to apply mathematics to psychological concepts. Psychologists who disliked mathematics in any shape, form or degree were likewise not interested, at least, not until they discovered it was an imperative duty to take notice. For the real

* *American Journal of Psychol.*, Vol. 15, No. 2, April, 1904.

† As this arrangement is now studied with reference to tetrad equations rather than "intercolumnar correlations," I have not referred to the latter.

‡ C. Spearman, *The Abilities of Man*, 1927, p. 74.

position was that considerable use of mathematics was essential and unavoidable before problems of human abilities could be effectively studied. Most scientists have on occasion to use their discretion when to accept or reject the results of mathematical analysis slightly or even greatly beyond their grasp.

Of the few who were qualified to assess the theory of two factors William Brown was some years later a prominent and able critic. His criticisms were directed mainly to the mathematical side and are slightly beyond the scope of an expository article for the non-mathematical reader. Brown has recently stated* that his verdict on the theory was never "disproved," but only "non-proven." When further evidence was accumulated he became favourably impressed and, at present, he is engaged on a crucial investigation in collaboration with Professor Spearman and Dr. Stephenson. In addition to the factor of g which has played so prominent a part in tests of intelligence there were three other factors found to extend so widely over regions of mentality that they were regarded by Spearman as general.† They are: General Inertia or Perseveration, General Oscillation, and a Character factor.

Spearman has attempted to interpret these general factors in physiological terms, although this is not at all fundamental to the theory of two factors. The g is now suggested to be measuring a general "power" (energy divided by time),‡ the other two cognitive factors would thus represent the inertia and oscillation of this energy.§ That no such explanation could well be advanced in the case of the conative factor seems clear. The important point is that if any of these factors are psychologically useful then physiological explanations can wait. In addition, Spearman has given evidence for the existence of about a dozen group factors: (1) a special logical ability which possibly may not be innate but acquired; (2) a mechanical ability; (3) arithmetical ability; (4) geometrical ability; (5) a special social ability; (6) reaction time; (7) ability to form visual and auditory imagery; (8) ability to appreciate music; (9) general memorization factor; (10) sensory memory; (11) verbal memory; (12) non-verbal symbolic memory.

* W. Brown, "The Mathematical and Experimental Evidence for the Existence of a Central Intellectual Factor (g)."—*Brit. Journal of Psychology*, Vol. 23, Pt. 2, 1932, p. 173.

† C. Spearman, op. cit., Chaps. 17, 19, and 20.

‡ C. Spearman, "The Theory of 'Two Factors' and that of 'Sampling'."—*British Journal of Psychology*, Vol. I, 1931, p. 154.

§ C. Spearman, *The Abilities of Man*, p. 414.

|| Ibid., Chap. 13 and Chap. 16. To these should be added a verbal factor (see below) and a fluency factor (cf. B. D. Karve, *M. Ed. Thesis*, Univ. of Leeds, 1929.)

The investigations which yielded this mass of evidence extended over many years and have blazed a trail throughout the field of cognition. There is still controversy and ample scope for further research concerning the existence, range and nature of some of these factors. But when the adherents of this school are accused of expelling faculties from psychology only to re-admit some of them through the back door in the guise of group factors, they can at least reply that any such factor must satisfy the tetrad janitor.

The view of Burt* on group factors is expressed in terms more closely related to scholastic abilities and is largely based on his own researches. He regards the following abilities as depending on group factors of varying range: arithmetical, manual (drawing, writing, probably handwork of simpler kinds), verbal (reading and spelling), literary (composition in one's own tongue), linguistic (learning foreign languages), artistic, and musical.

Although tests of these abilities would depend on acquired dexterity, knowledge, and interest yet he argues that there is an innate basis for such abilities and adds: "On the existence and nature, therefore, of these hypothetical "group-factors"—inborn powers that seem partly general, but not entirely so, partly specific but not absolutely so—further research is imperatively needed."†

If these group factors were easily detected the task of the vocational psychologist would be light, but actually he finds it much easier to measure the general factor *g*, or to test a sensory or motor function, or even to observe certain orectic tendencies.

III.—FACTORS AS PSYCHOLOGICAL CONCEPTS.

A factor, in ordinary parlance, is anything which goes to the composition of anything else. Thus the profit of a business firm may be ascribed to the amount spent on advertising, to that spent on the welfare department, to the relative absence of competitors, and to many other factors. If it is assumed that their effects are additive, it is obvious that in order to give each factor its due weight, it may be necessary to raise it to some power, positive or negative, integral or fractional, or even to form with it a more complicated mathematical expression and finally to multiply each factor with an appropriate constant.

* C. Burt, *The Distribution and Relations of Educational Abilities*, 1917.

† C. Burt, *The Mental Differences between Individuals*.—Report of the Brit. Association, 1923.

Cf. also by the same author, *The Measurement of Mental Capacities*, being the Henderson Trust Lecture for 1927.

In mathematical parlance, on the other hand, a fourth form pupil knows only too well that a function does not consist of the sum of its two factors but of their product. He does not yet know that there is a Taylor's theorem and a Lagrange's theorem which allows a function under certain conditions to be expressed with some approximation as the *sum* of its two factors. In virtue of these theorems Spearman was enabled to write an equation which is a precise mathematical expression of the theory of two factors, namely,

$$m_{ax} = r_{ag}g_x + r_{as}s_{ax}$$

where m_{ax} denotes the measurement obtained for any individual x in any ability a , g_x his amount of g , r_{ag} the correlation between the whole measurement of a and the factor g , and r_{as} the correlation between the whole measurement of a and the factor s_a specific to a .

A second difficulty is that when the student of psychology hears of a factor, he expects it to have a permanent place and value in his psychological scheme, and his expectation would appear to be highly reasonable. That is, a psychological factor must possess functional unity or an enduring entity before it can be regarded as significant. Yet in the mathematical sense a factor may obviously be regarded as general in one problem, as group in another, and as specific in the next. Thus $a+b$ is a general factor in the series $\Sigma(a^n \dots b^n)$ if n is an even integer, but only a group factor in the series $\Sigma(a^n + b^n)$ if n is any integer, and clearly only a specific factor in such a series as $a+b, b+c, c+d, d+e, \dots$

In other words the functional value of the factor $a+b$ depends on the problem in hand. There are instances in psychology where this distinction is worth noticing. Thus in a battery of eight intelligence tests, the factor common to all, namely g , undoubtedly possesses functional unity, at least to the adherents of the theory of two factors; but the specific factors, such as s_1 which is specific to the first test, need have no special psychological importance for the problem in hand, the measurement of intelligence. The specifics here may be regarded merely as sampling errors which demand elimination. Yet when the first test is studied by itself it is necessary to regard success in it as being due to the two permanent factors, the g_x of the individual under consideration and s_{1x} his specific ability for the test, due care being taken that the test is not greatly affected by degree of training.

In the third place, the specific factors s_n and s_{n+1} which are operative in the tests x_n and x_{n+1} are not regarded as ultimate and unanalysable. Thus each may be regarded as consisting of two elements, one being common to both, so that

$$s_1 = s_n^1 + k$$

$$s_{n+1} = s_{n+1}^1 + k$$

IV—THE TETRAD DIFFERENCE CRITERION WITH ILLUSTRATION.

As a simple illustration of the use of the tetrad difference criterion I have taken the liberty to use figures approximating to those found in the careful work of Wilson,* and have selected four out of the nine tests which he employed. The inter-correlations are given in the following table :

		1	2	3
Visual Memory for Digits	1 ..	—		
Opposites	2 ..	.28	—	
Definition of Words	3 ..	.38	.62	—
Picture Completion	4 ..	.23	.36	.33

Using the notation due to Kelley we may write the tetrads :

$$t_{1234} = r_{12}r_{34} - r_{13}r_{24} = .28 \times .33 - .38 \times .36 = -.0444$$

$$t_{1342} = r_{13}r_{24} - r_{14}r_{23} = .38 \times .36 - .28 \times .62 = -.0058$$

$$t_{1423} = r_{14}r_{23} - r_{12}r_{34} = .23 \times .62 - .28 \times .33 = .0502$$

I have followed Holzinger† in writing t_{1423} instead of t_{1243} so as to make the sum of the three tetrads for four variables equal to zero.

The formula for the probable error of t_{1234} may be written

$$PE t_{1234} = \frac{.6745}{\sqrt{N}} \left\{ r_{12}^2 + r_{13}^2 + r_{14}^2 + r_{24}^2 + r_{23}^2 - 2(r_{12}r_{13}r_{23} + r_{12}r_{14}r_{24} + r_{13}r_{14}r_{34} + r_{23}r_{24}r_{34}) + 4r_{12}r_{13}r_{24}r_{34} \right\}^{\frac{1}{2}}$$

Substituting the number of pupils, 74 for N . This is .028. t_{1234} is, therefore, less than twice its probable error and can therefore be considered insignificant. Similar formulæ would give the probable errors of t_{1342} and t_{1423} . If they are also insignificant it would be established that the marks in the four tests are due to one general factor g together with four uncorrelated specific factors.

If, on the other hand, we take two tests of g , and two others which involve a group factor in addition to g , it would be found that some tetrads would have a significant value, that is, at least greater than three times their probable error. Thus the tetrad difference criterion may be used either to detect the presence of a general factor or that of a group factor.

* J. H. Wilson, *The Nature of Intelligence*.—*Jl. of Educ. Psychol.*, Vol. 22, 1931.

† K. J. Holzinger, *Statistical Résumé of the Spearman Two-Factor Theory*, 1931, p. 3.

V.—THORNDIKE'S VIEWS.

Professor Thorndike, America's premier authority on the psychology of learning, had early seen the importance of the method of correlation.* But for some years he was struck by the absence of any factor common to tests of general intelligence and in 1909 wrote that "one is almost tempted to replace Spearman's statement by the equally extravagant one that there is *nothing whatever* common to all mental functions or to any part of them."† That is obviously a comment rather than a theory. In 1920 he wrote: "There is a general rough correspondence or correlation such that a man notably intelligent in one respect will usually be above the average in others also."

And further: "For ordinary practical purposes, however, it suffices to examine for three "intelligences" which we may call mechanical intelligence, social intelligence, and abstract intelligence."‡ The first quotation certainly does not disprove the functional unity of *g* and although Spearman would vigorously oppose the tripartite division put forward in the second quotation and would assert that *g* permeates all three, yet Spearman has given evidence for a group factor of mechanical ability and also for one social group factor. It therefore looks as if the two views have points of agreement. In any case I am not aware that Thorndike has produced evidence for his social intelligence and admits that convenient tests of social intelligence are hard to devise. I must further express surprise that Spearman's "psychological relation" which would be manifest in tests of "social intelligence" has not been more intensely studied with the aid of the tetrad criterion. Its ramifications are so complex that it would indeed be poor hunting if within this wide field no further factors were discovered.

A few years later Thorndike attempts to show how his doctrine of connectionism would account for differences between individuals in intelligence. Briefly, his argument is that the person whose intelligence is greater or higher or better than that of another person differs from him in the last analysis in having, not a new sort of physiological process, but simply a larger number of connections of the ordinary sort.§ Thorndike is fully aware that there is no histological or physiological evidence for this view, for he writes: "At present, however, we know so little of the

* Aikens and Thorndike, "Correlations among Perceptive and Associative Processes."—*Psychol. Rev.*, IX, 1902.

† Thorndike, Lay, and Dean, "The Relation of Accuracy in Sensory Discrimination to General Intelligence."—*Amer. J. of Psychol.*, Vol. 20, 1909, p. 368.

‡ E. L. Thorndike, "Intelligence and its Uses."—*Harper's Monthly Mag.*, Europ. Edn., January, 1920.

§ E. L. Thorndike, *The Measurement of Intelligence*, 1926, pp. 412-430.

neural correlates of intellect that if twenty college freshmen were immolated to this inquiry, ten being the most intellectual of a hundred, and ten being the least intellectual of the hundred, and their brains were studied in every way by our best neurologists, these could probably not locate sixteen out of the twenty correctly as at top or bottom."*

The method used in order to test his hypothesis was to consider the tests of sentence completion, arithmetical problems and analogies as examples of the "higher" abilities and vocabulary tests, routine and informational arithmetic, and information as examples of the "lower" or purely associative abilities, and as the "higher" correlated as closely with the associative as the "higher" do *inter se*, or as the associative do *inter se*, he regards this as almost a crucial proof that his hypothesis is valid. Spearman, however, points out that Thorndike is in error in singling out his so-called "lower" tests as being tests into which the use of relations does not enter.†

VI.—THOMSON'S SAMPLING THEORY.

"In place therefore of the two factors of that theory, one General and the other Specific, Thomson prefers to think of a number of factors at play in the carrying out of any activity such as a mental test, these being a sample of all those which the individual has at his command." . . . "The Sampling Theory, then, neither denies nor asserts General Ability, though it says it is unproven. Nor does it deny Specific Factors."‡

It certainly asserts that there must be Group Factors which are regarded as the most general of the three categories of factors, yet it is apparently found a difficult task to specify any. Thomson explains the correlations between mental activities by assuming that each activity is a sample of many factors much smaller than the factors contemplated by Spearman. It would appear that the operation of these factors is atomic in its tendency, as the Mendelian theory is atomic. This reads as if specific factors are vital to the theory. As Hull, and also Dodd, have abandoned specific factors and as Hull champions a strict group factor theory and even claims Thomson as an ally§ I find some difficulty in understanding the implications of the sampling theory.

Both Spearman and Thomson are agreed that their respective theories may be true simultaneously.

* Ibid., p. 12.

† C. Spearman, "G" and After: A School to end Schools. *Psychologies* of 1930.

‡ W. Brown and G. H. Thomson, *The Essentials of Mental Measurement*, 1925, p. 188.

§ C. L. Hull, *Ability Testing*, 1928, p. 203.

Thomson further adds that if the tetrads, within the usual limits of probable error, are equal to zero, then for tests where this is so, the sampling theory reduces to the theory of two factors. But he points out that every effort must be made to reduce their error by using a large number of subjects. Such a procedure would be welcomed as a crucial test, but once the agreement is found satisfactory it would be quite in order for investigators to employ a much smaller number of subjects and yet hope to get reliable results by employing the safeguarding devices of Fisher* and others.

VII.—KELLEY'S RESEARCHES.

Kelley rightly stresses that before a concept, which is definable and verifiable, can be worthy of serious consideration as an independent category of mental life, it must be subjected to objective measurement. He further adds that the tetrad difference method seems to be the only way other than that of introspection available for determining the discreteness of mental phenomena.† There are three reasons why the researches of Kelley should afford considerable satisfaction to Spearman. The first is that an investigator who has rather aptly been called the "Karl Pearson of America" should have employed the tetrad difference criterion as his master-key. The second is that he chose in the main to prosecute a simultaneous study of those factors which in view of Spearman's work were likely to prove most promising, namely, general ability, manipulation of spatial relationships, facility with numbers, facility with verbal material, memory, and mental speed. The third is that Kelley's findings agree so closely with those of Spearman. "On the whole the two sets of findings are quite remarkably in harmony, the agreements being in the matter of a spatial, a numerical, a memory, and even a general factor, though this last is differently interpreted, and also in the conclusion that a large number of specific motor (probably also sensory) factors exist. There is scarcely a disagreement in the matters of music, purpose, cleverness, and sex, though here the data are inadequate. There does seem to be a real disagreement in the importance and extent of a verbal factor and in that of a mental speed factor."‡

Kelley does not quite subscribe to the view that the thing called *g* in all of Spearman's studies is the same throughout. "There seem to be two, and perhaps three, traits combined in this one concept. First, there is a factor making for correlation between variables due to maturity,

* R. A. Fisher, *Statistical Methods for Research Workers*, 1928.

† T. L. Kelley, *Crossroads in the Mind of Man*, 1928, p. 7.

‡ T. L. Kelley, *Crossroads in the Mind of Man*, 1928, p. 22.

race, sex differences, and differences of antecedent nature."* It does not appear, however, that Kelley has produced any positive evidence as to the importance of these alleged factors. His second factor is a verbal factor which he affirms is present in the ordinary tests of *g*. And here he has since been supported by Stephenson† and later by Gowda‡ whose work shows clearly that there is a necessity to attach a more precise meaning to what is covered by the term "verbal factor." It should be added that Davey§ had concluded that there was no evidence of a verbal factor, and later Wilson|| arrived at the same result.

Kelley's third factor may here be neglected as he gives no inkling as to what it may be and moreover believes it to be very small.

VIII.—OTHER THEORIES AND HYPOTHESES.

Space does not allow more than a passing reference to other theories. Unless they are backed by experimental evidence they should be regarded only as hypotheses and in some cases these are so general and indefinite that they are too sterile for scientific use. Woodrow** in 1919 proposed a multifactor theory, contending that the factors belong to many different degrees of generality. Thurstone†† advocates multiple factor analysis.

Hull‡‡ advocates a strict group-factor theory. Just as this paper is going to press I have seen that Tryon advocates multiple factors and criticizes the theory of two factors.§§ It does not appear to me a very happy description when this writer, in referring to Spearman, Kelley, Thurstone, Thomson, and others, maintains that each chooses the number of his factors, not on mathematical grounds, but on the basis of his own psychological bias. By collecting into a table a list of forty-one factors or disturbers he attempts to discredit two-factorists by alleging that they can make any one or more of these disturbers responsible for the non-vanishing of their tetrads. It is sufficient to say that most authorities would agree that the majority of the disturbers which have been thus tabled would certainly require control. Only about a dozen of them are group factors !

* *Ibid.*, p. 17.

† W. Stephenson, "Tetrad Differences for Verbal Subtests."—*Jour. Educ. Psychol.*, Vol. 22, 1931.

‡ A. C. D. Gowda, M.Ed. Thesis, Univ. of Leeds, 1932.

§ C. M. Davey, "A Comparison of Group Verbal and Pictorial Tests of Intelligence."—*Brit. J. of Psychol.*, Vol. 20, 1929.

|| J. H. Wilson, *loc. cit.*

** H. Woodrow, *Brightness and Dullness in Children*, 1919, p. 231.

†† L. L. Thurstone, "Multiple Factor Analysis."—*Psychol. Rev.*, Vol. 38, 1931.

‡‡ C. L. Hull, *loc. cit.*

§§ R. C. Tryon, "Multiple Factors v. Two Factors as determiners of abilities."—*Psychol. Rev.*, Vol. 39, 1932.

In conclusion, three general observations may be added :

(1) The tetrad difference technique is now generally regarded as an essential method for investigating the relations between mental abilities.

(2) General and group factors have been mentioned in virtue of the evidence that they extend over a more or less wide range. There are many grounds for expecting further research to add to their number.

(3) There is no reason why multifactor methods of analysis should not prove serviceable in certain cases, but this does not affect the validity of the theory of two factors.

Résumé.

DES THÉORIES ACTUELLES SUR LES FACTEURS INTELLECTUELS (GÉNÉRAUX, CENTRAUX ET SPÉCIFIQUES.)

Les facteurs, considérés comme des concepts psychologiques, datent de la publication, en 1904, de l'œuvre de Spearman : *General Intelligence, objectively determined and measured*.

La "Théorie des Deux Facteurs," et d'autres méthodes, découvertes par Spearman, firent ressortir trois facteurs dans la cognition (capacité générale, persévérance, et oscillation) et un dans la valenté, et leur importance psychologique leur donna droit au titre "général." En plus le témoignage a été peu à peu amassé surtout par Spearman et ses élèves, de l'existence d'un nombre de facteurs centraux, plus ou moins compréhensifs, tels le facteur arithmétique, le géométrique, le logique, le mécanique, plusieurs dans la mémoire, le musical, le social, le verbal. Les recherches de Kelley servent, pour la plupart, à soutenir cette théorie. Il y a cependant un certain manque de conformité parmi des investigateurs compétents, et puisque ces facteurs centraux ont une si grande importance pour l'orientation professionnelle, aussi bien que pour l'éducation en général, il y a un besoin pressant de recherches plus étendues.

La "Théorie de L'Échantillonnage" de Thomson est quelquefois considérée comme incompatible avec celle des "Deux Facteurs," et pourtant Spearman et Thomson sont d'accord que toutes deux peuvent être vraies, et ils admettraient, sans doute, que, parmi toutes les théories qui ont été avancées, il faut choisir celle qui est la plus utile aux psychologues.

ÜBERSICHT.

MODERNE THEORIEN ÜBER INTELLEKTUELLE FAKTOREN. (ALLGEMEINE, SPEZIFISCHE UND GRUPPENFAKTOREN.)

Faktoren als psychologische Begriffe leiten ihren Ursprung von dem Auftreten im Jahre 1904 des objektivisch bestimmten und gemessenen Spearman'schen "Allgemeine Intelligenz"-faktors her.

Die Theorie der Zwei Faktoren und andere von Spearman erdachte Methoden liessen drei Erkennungsfaktoren (allgemeine Intelligenz, Perseveration, und Schwankung) und einen strebenden Faktor entstehen, und ihre psychologische Bedeutung berechtigt sie zur Bezeichnung *allgemein*.

Noch dazu, sind Beweise allmählich angehäuft worden und zwar von Spearman und seinen Schülern für das Bestehen einer Anzahl mehr oder weniger breiten Gruppenfaktoren, wie z. B. Rechen-, geometrische, logische, mechanische, vielseitige Erinnerungs-, musikalische, soziale, und wörtliche Faktoren. Die Kelly'schen Forschungen bestätigen im grossen ganzen die Ergebnisse. Es besteht aber ein gewisser Mangel an Übereinstimmung unter kompetenten Forschern und da Gruppenfaktoren viel Bedeutung für die Berufspsychologie haben sowohl als im Erziehungswesen überhaupt, so braucht man dringend weitere Untersuchung.

Thomsons Teilmengentheorie wird zuweilen für unvereinbar mit der der Zwei Faktoren gehalten, jedoch meinen Spearman und Thomson, dass beide wahr sein können und sie würden sich zweifellos einverstanden erklären, dass von allen vorgeschlagenen Theorien diejenige, die für die Psychologie von grösstem Nutzen ist, vorgezogen werden sollte.

AN ENQUIRY AS TO INTERESTS AND MOTIVES FOR STUDY AMONG ADULT EVENING STUDENTS.

BY JOSEPH DENZIL HOY.

(From the Department of Education, University of Birmingham.)

- I.—Object of Enquiry.
- II.—Questionnaire and Results.
- III.—General Observations.
- IV.—Conclusions.

I.—OBJECT OF ENQUIRY.

SEVEN Adult Evening Institutes in various parts of a large industrial city were visited for the purpose of submitting the students to a miscellaneous questionnaire with a view to discovering the interests and motives for study of such adult students as attend evening institutes. Each student was supplied with a typewritten copy of the questionnaire, sufficient space being left between the questions for answers to be given. The total number of answers received to the questionnaire was 372 (161 men and 211 women).

II.—QUESTIONNAIRE AND RESULTS.

Question 1: Name (optional).—Whether a student added his or her name or not was an entirely optional matter, as it was felt that some students might not wish to divulge certain information while, on the contrary, other individuals might evince little interest in filling in the questionnaire if they were not to be credited with what they wrote. Students were asked to put "F" (female) or "M" (male) on the top.

Question 2: Age (You may put "A" if 21 or over).—All answers came from students over the age of 17, many coming from people of middle age and over.

Question 3: At what school did you receive your education?

<i>Students who have had a Secondary Education.</i>	<i>%</i>	<i>Students with previous Elementary Education only.</i>	<i>%</i>	<i>Uncertain previous Education or not stated</i>	<i>%</i>
110	30	247	66	15	4

Question 4: Did you like day-school? 317 replies, representing 85 per cent, expressed a liking for day-school, so it would appear at least suggestive that it is chiefly those liking day-school who desire to continue their education in later life.

The object of the two following questions was to discover whether there was any connection between preferred subjects at school and work taken up in later life.

Question 5: What subjects (or subject) did you like best at day-school? 170 students, or 46 per cent, wrote in favour of some branch of English, while Mathematical subjects (141, or 38 per cent), History (85, or 23 per cent), Geography (59, or 16 per cent), Art (55, or 15 per cent), General Science (51, or 14 per cent) follow next in order of preference.

Since many of the ex-elementary school pupils had studied no language other than their own, or no science while at school, the order must be viewed with these reservations in mind.

Question 6: What is your present occupation? 223, or 60 per cent, of the replies came from office workers of one kind or another, 11 (3 per cent) from teachers, 18 (5 per cent) from housewives or other domestic workers, 41 (11 per cent) from artisans in various trades, such as engineering, joinering, tailoring, etc. Shop assistants and policemen were included, and, in addition, 48 (13 per cent) from workers in various unclassified occupations.

Question 7: Do you like your present work? This question was included in the questionnaire in order to find whether students disliking their daily work looked upon evening school as a channel to something better. An interesting fact emerges from the information supplied, namely, that 294 or 75 per cent of the students expressed a liking for their present occupations, thus affording little testimony to the motive which prompted the question.

The following four questions were set to ascertain whether there was any relationship between types of individuals and the pursuance of courses of adult education.

Question 8: Do you prefer mental (mind) or manual (hand) work?

<i>Preference for Mental Work.</i>	<i>%</i>	<i>Preference for Manual Work.</i>	<i>%</i>	<i>Indifferent.</i>	<i>Liking for both.</i>	<i>No Reply.</i>
238	65	70	19	13	42	9

Question 9 : Do you like the same work or continual variety?

<i>Liking for same work.</i>	<i>%</i>	<i>Liking for variety.</i>	<i>%</i>	<i>Liking for both.</i>	<i>Indifferent.</i>	<i>No Reply.</i>
41	15	290	86	2	2	37

Question 10 : Do you prefer indoor or outdoor work?

<i>Preferring Indoor.</i>	<i>%</i>	<i>Preferring Outdoor.</i>	<i>%</i>	<i>Liking for both.</i>	<i>Indifferent.</i>	<i>No Reply.</i>
190	55	125	34	21	12	24

Question 11 : Do you love responsibility or do you dislike it?

<i>Love of Responsibility.</i>	<i>%</i>	<i>Dislike of Responsibility.</i>	<i>%</i>	<i>Indifferent.</i>	<i>No Reply.</i>
304	82	31	8	11	26

Questions 8, 9, 10, and 11 reveal a few rather remarkable facts. After making allowance for the non-replies, 65 per cent of the students had a preference for mental over manual work. As eleven teachers were among the students answering the questionnaire, this number, together with the number of office workers, totals approximately 65 per cent, which is the percentage preferring mental work. The writer was rather surprised to find that, generally speaking, those preferring manual work were already engaged in manual occupations, and those preferring mental work employed in work that was definitely mental in content. There were naturally a few exceptions, but, on the whole, it seems fairly safe to infer that a student did not attend an evening institute with a view to changing over from manual to mental work and *vice versa*.

It is perhaps deplorable in the present state of working conditions that a change of work cannot more often be arranged in this too frequently commonplace life ; 86 per cent of the answers expressed a liking for variety of work in some form or other. Unfortunately monotony in the daily occupations of many is likely to be more acute in the time to come and the need of adult education to supply new interests to counteract the incessant mechanization of industry is all the more urgent.

In regard to indoor and outdoor work, there was a slight excess of replies in favour of indoor work, and here again the outdoor workers on the whole were satisfied with their work and did not envy their colleagues whose work confined them within walls. The responses from indoor workers, too, showed that they were quite satisfied with their work under indoor conditions. The fact that 82 per cent of the students love responsibility is surely indicative of a healthy sign of ambition among evening school students, though love of responsibility may in some cases mean chiefly a desire for a higher and better paid job.

Question 12: What is your chief reason for attending an Evening Institute?

Question 13: What subject (or subjects) do you take at the Institute?

Question 14: Why do you take the subject (or subjects) mentioned in the last question?

The information supplied to these last three questions rather overlapped, which was probably due to the nature of the questions. The reason for attending an evening institute proved in many cases to be the same as the reason why a certain subject (or subjects) (question 16), were taken at the institute. Many subjects are taken for purely vocational reasons, especially among office-workers selecting such subjects as shorthand and book-keeping. Fortunately, however, there is a large remainder taking subjects for purely cultural reasons and interest in the subjects themselves; witness the following examples of replies given for various subjects chosen: Psychology—"To enable me to understand myself and others better"; Art—"Because I love it"; Literature—"For a wider view of literature in general"; Choral—"Because I enjoy singing"; Esperanto—"Because I believe in and enjoy internationalism," "I am interested in the ideals of the Esperanto movement"; First Aid—"To be able to help people in need"; French—"To keep it from rusting"; Drama—"Drama is my hobby"; Leatherwork—"Love of it"; Physical Training—"For exercise"; Handicrafts—"As a change from daily work" (a clerk); Singing—"Provides a recreation after the day's work and is a general cure for gloom and despondency"; Elocution—"For correct speaking."

The reasons given for attending an evening institute are, of necessity, many and varied. The answers, however, fall into the six fairly well defined groups. The majority of the answers made it clear that students went to evening institutes to gain knowledge, to improve their education or to widen their outlook on life generally. Typical among this section is the reply of a labourer by occupation who gave the following as his

reason for attending the institute—"To enlarge my outlook." The next largest group consisted of those who went to classes for examination or other purposes connected with their employment. Apart from a few cases of compulsory attendance there was evidence of much genuine ambition among this class of student. The third group, perhaps the most culture-loving of all the groups, is composed of those students who go to an evening institute out of pure interest in some subject or groups of subjects, such as the various forms of craftwork, which are studied for love of the subjects themselves. Some students look upon their institutes as places for the useful occupation of leisure time or "for a hobby" as one or two put it. "To have a definite something for a definite evening" was another student's way of expressing this point. Others prefer to regard their institute as a place of recreation, especially students in physical training classes. This group also includes some who felt that the classes made a change from their daily work. Among the replies of those expressing a liking for institutes for social reasons, the following may be cited: "To meet people"; "To mix with other people"; "Companionship"; "Principally to fill in lonely hours" (a housewife); and last, the case of a somewhat frivolous young lady whose sole object (if she is to be taken seriously) in going to an evening school was "To see the boys."

ANALYSIS OF REASONS GIVEN FOR ATTENDANCE AT EVENING INSTITUTE.

	<i>Number.</i>	<i>Approximate Percentage.</i>
(1) Desire for knowledge, education, general educational improvement, "improvement"; to widen views, outlook, etc.	160	43%
(2) For examination purposes, business reasons, improvement in occupation, advancement, etc.	115	31%
(3) Interest in study or some particular branch of study.	37	10%
(4) Useful occupation for leisure time; a hobby.	16	4%
(5) For recreation, exercise, change from day work	12	3%
(6) For social reasons (e.g., meeting other people)	8	2%
No reply	24	6%
TOTAL	372	

Question 15: Would you like to attend a class (lectures, talks, and discussions) in science treated in a popular way as it affects your everyday life?

This question was included to investigate the feeling and opinion in regard to this rather undeveloped branch of adult education. Out of 344 replies given, 270, or nearly 78 per cent, answered in the affirmative, and the writer fully believes that there would have been a still greater proportion in favour of the subject had further enlightenment been provided as to the nature of a general science course. Certain students in some classes asked for further information about the question; for, indeed, some had little or no conception of what science entailed. The keenness with which some students anticipated a science class can be judged from replies like "most certainly," "very much," "rather," etc. It is interesting to note also that the demand for science among women was very pronounced.

Question 16: Would you like your institute to develop more "club" life in which you could take an active part alongside your studies?

Whether the future will see the development of numerous clubs or "social-educational" institutes where education and social life will proceed alongside each other on a greater scale than at present was the motive of this question. In short, will the familiar club as it is known to-day acquire a distinct educational significance and become an important feature in English life? After making allowance for 35 "no replies" in the question, nearly 74 per cent of the students would like more club life in their institutes. The matter is discussed later in this paper; for, in the writer's opinion, the question of "social-educational" institutes is the key to success in future work among adults.

The next six questions were designed to seek information as to how leisure time is largely spent.

Question 17: About how much reading do you do in your spare time?

Question 18: What kind of books (or what author's) do you prefer?

Question 19: Are you a member of a library?

Question 20: Are you fond of sport or games?

Question 21: What kind of sport or games (indoor or outdoor) do you follow?

Question 22: Have you any hobbies? If so, what are they?

The majority of students answering Question 17 did varying amounts of reading in their spare time; a few did none, while the reading of some students did not aspire to, or their time did not permit of, reading other than the daily newspaper. 57 per cent were members of a library. To assign each author commonly read a definite number of votes of

popularity as recorded by the answers given in Question 18 is hardly possible, as the question asked for either kinds of books or authors preferred. An order has been drawn up, however, on the following lines:—The first class is composed of the most widely read books as revealed by the answers. An undoubted first place is given to lighter literature or fiction in the generally accepted sense of the word. Mystery and detective stories are far and away the most popular, the name of Edgar Wallace appearing dozens of times in the answers. P. G. Wodehouse, Jeffery Farnol, E. M. Dell, Sabatini, and E. Phillips Oppenheim are also exceedingly popular.

The second class, that is, literature of a higher form, includes those novels which rank as classics and are definitely superior in literary merit to the first class. Results prove that Dickens is still very popular among such students as are found in evening institutes. Next in order of popularity are G. B. Shaw, Galsworthy, H. G. Wells, W. J. Locke, and Shakespeare. It may be that some students had Shakespeare in mind when they asserted their love for plays, though most of the dramatic classes study some of the excellent modern plays that are available to-day.

The third place in the reading classification is secured by historical books and novels which appear to be in good demand, the works of Dumas being referred to in no fewer than eleven replies. Science books are fairly extensively read, though it must be borne in mind that this class incorporates works on natural history, physiology, anatomy, and other medical books that are read by students in connection with first aid classes. Many are entertained by French books, while Adventure, Plays, and Drama are all equally popular.

It is interesting to recall in this connection an investigation conducted in 1913 by the late Professor J. A. Green of Sheffield University, into the amount and kind of reading done by boys attending evening schools in the West Riding of Yorkshire. Professor Green stated that the results were not pleasing and the obvious motive was that of killing time.* Although the present investigation is concerned with older students, there is a decided improvement in the extent and nature of the reading done.

84 per cent of the students took part in some kind of sport—football and cricket being the most popular with males and tennis with females. Also, more had hobbies than was previously imagined by the writer; 60 per cent of the adults submitting replies had hobbies of some kind

*The Teaching of English," by Professor J. A. Green.—*Journal of Experimental Pedagogy*, Vol. II, No. 1, pp. 14-25.

or other ranging from various forms of craft-work to stamp collecting and "collecting information—newspaper cuttings, etc." as one student wrote.

Question 23: How often do you go to the cinema in one week?

Number attending cinema more than once per week=33 or 9 per cent.

Number attending cinema once per week=115 or 31 per cent.

Question 24: Do you consider you have derived much educational benefit from the following and in what ways? (a) The Cinema. (b) Broadcasting.

This question was set to find the opinion of the average adult with regard to the educational value of the cinema and broadcasting. The results as gathered from the replies may be set out as follows:

Number who say they have derived educational benefit from the cinema, 108, or 29 per cent.

Number of students who say they have derived educational benefit from broadcasting, 193, or 52 per cent.

Number of students with no facilities for listening-in, 128, or 34 per cent.

Many papers contained adverse criticism of the cinema, especially of American films, but of those stating they had derived educational benefit, at least 24 of the 108 wrote in favour of geographical and travel pictures and of opportunities that the cinema provided of getting glimpses of other lands. Three or four spoke highly of such films as "With Byrd to the South Pole," which have truly educational value. Nature study and natural history pictures appealed to at least six, while historical films like "Disraeli" were mentioned in four responses. Others mentioned that benefit was derivable from the good acting of the "stars," and some answered to the effect that films of books had a definite educational value in so far as they tended to correct any pseudo-mental impressions gained during the reading of the books.

The number of people deriving educational benefit from broadcasting presents a striking contrast to the cinema. After allowing for the astonishingly large percentage of 34 with no facilities for listening-in, there remain 79 per cent of the actual listeners who are loud in their praises of the educational value of broadcasting. Many among the number paid tribute to the excellence of the various talks and lectures given, and a large number of students stated that they had benefited by listening to good music. The plays and dramatic work of the B.B.C. received mention by some students, while a few added that they had gained by hearing correct pronunciation from wireless. The answers

showed evidence of appreciation of the language talks by some people, while political and other speeches by great men of the day were also referred to as a source of educational value. From one or two answers it could be inferred that technical difficulties in actual reception marred much of the broadcast programmes, while one student wrote that in her home "the wireless is too constantly in action." There can be little doubt that broadcasting is among the greatest educational advances in the present era. Music, drama, accurate and impartial talks free from all prejudice and partisanship, make it a powerful stimulus in the country and one capable of still greater things in the future.

III.—GENERAL OBSERVATIONS.

Although science was more prevalent in the early stages of the adult education movement, it has shown a marked decline during the present century. The following figures from the report "Science and Adult Education"* are clearly indicative of the general falling away of science in classes of the Workers' Educational Association.

<i>Cambridge University (Local Lectures).</i>	<i>Courses Delivered.</i>	<i>Science Courses.</i>	<i>Percentage of Science Courses.</i>
1882-1887	377	189	50
1901-1906	552	156	28
1921-1926	367	52	14
<i>Oxford University (Extension Courses)</i>			
1886-1891	476	127	27
1901-1906	706	152	22
1921-1926	454	44	10
<i>London University (Extension Courses)</i>			
1882-1887	288	120	42
1901-1906	863	251	29
1921-1926	926	35	4

In the seven adult institutes visited there was not one class in the whole of the programmes which made provision for any form of natural science. In a great city like the one under consideration, the technical

*" Natural Science and Adult Education "— Paper No. 8 of the Adult Education Committee of the Board of Education, p. 13.

colleges naturally provide for many science students, but the type of course provided by a technical institution is hardly likely to meet the needs of the adult seeking to study science for the sake of the subject itself. Technical college courses of study are generally governed by examination requirements, whereas the typical adult student wishes to know something of the broader issues of science in general without the hampering restrictions imposed by examination syllabuses. "What is wanted," maintains Sir Richard Gregory,* "is a humanizing of science, a study of the action and reaction between scientific knowledge and social life, rather than explanations of facts and principles, whether presented as wonders or as possible aids to industry. Where one person will exercise his intelligence to understand the scientific nature and meaning of a discovery, a thousand are ready to admire the high purpose of a scientific quest and reverence the disinterested service rendered by it to humanity. This is the side for which expositors are needed, so that the influence of scientific knowledge upon social and economic conditions may be widely understood and be rightly used by the community."

It is true that lack of adequate laboratory accommodation will always prove a difficulty in adult education but the importance which many teachers attach to laboratory work for adults is surely unfounded. A great deal can be done by means of well-conducted discussions in the presence of a tutor with the aid of specimens, slides, diagrams, pictures, and some apparatus as occasion demands. The Report on Natural Science in Adult Education states† "we recognize the difficulties experienced by adult students in the use of laboratories, and we consider that for many courses in Natural Science constant work on the part of the students in a laboratory will not be essential."

An obstacle still barring the way to the progress of science teaching in this country is the common opinion that any form of technical education is primarily vocational and is devoid of liberal training. Even in its lower stages it is questionable whether this charge is justifiable unless the course of science instruction is dominated by some narrow examination requirements. In its higher phases the gulf between liberal and vocational can be easily bridged if the broad interests suggested above are kept constantly in mind. Meanwhile we must look forward to the time when a proper blending of the sciences and the humanities will be regarded as a pre-requisite to a liberal education.

The most outstanding need of the adult education movement at the present time is, in the writer's opinion, the lack of a permanent home for

*"Natural Science in Adult Education," pp. 10-11.

†Op. cit., p. 48.

many of its branches. Among the students answering the question "Would you like your evening institute to develop more 'club' life in which you could take an active part alongside your studies?" approximately 74 per cent answered in favour of greater social amenities in connection with their evening institutes, and some were quite emphatic in their statements in support of the club atmosphere and social activities of their institutes. Too often in evening institutes students go to their classes and leave without any association with other students either in their own particular class or other classes in the same institute. Moreover, the lack of comfort in the buildings, which are usually elementary schools of the city, is hardly conducive to any form of social intercourse. Cheerless buildings devoid of common rooms, large, bare classrooms with desks totally unfitted for adults, constitute the conditions amid which adult education is expected to prosper. Were more attention given to the students—their personal comfort and their social life—the writer is convinced that local authorities and other governing bodies would be amply repaid by the enthusiasm, better attendance, and increased numbers of students. Though much is attempted by the enthusiastic heads of adult evening classes many of their efforts are probably rendered fruitless by the conditions under which they strive.

A plea is made here that adult education may develop on the lines laid down by the Educational Settlements where co-operation between various educational groups goes on at its best. In brief, settlements are community centres for diverse kinds of work with a fine corporate life existing between the students and tutors. The democratic government, the freedom and fellowship enjoyed by the students, and the close relationship with the university on the one hand and the L.E.A. on the other, have done much to make this type of organization an example to the country for the future development of adult education.

Settlements have as a rule been founded in old residences renovated and reconstructed to meet the needs of social-educational institutes; if L.E.A.'s were unable to imitate this admirable plan, they could at least, when building new day schools, set aside a few rooms forming a wing of the building which could be equipped and adapted specially for the use of adult students. There is still another possible way out of the difficulty suggested at the Annual Conference of the British Institute of Adult Education at Balliol College, Oxford, 1922,* and that is to concentrate the existing non-vocational classes in technical and commercial colleges. This plan has the advantage of bringing home to the students the

*Report on British Institute of Adult Education Conference held at Oxford, 1922.

importance of other subjects of study, but to be a success libraries and common rooms must be provided for smoking and conversation, and, in brief, a social-club spirit should permeate the institution.

London has shown what can be done with its literary men's and women's institutes. Though one or two of the Literary Institutes have their own buildings the majority have their own quarters in the city's secondary schools, thus offering a contrast to other cities where adults are frequently compelled to meet in the less comfortable elementary schools. A head teacher of a London Women's Institute writing in the journal of Adult Education* says, "The social life of the Institute is unobtrusively fostered and developed. The rigid scholastic atmosphere of the formal evening institute is entirely alien to it. A happy friendliness and sociability permeate everywhere. The institute is not merely a building in which instruction is given in a number of subjects. The personal touch is never lacking, and the atmosphere is that of a social club rather than of a forbidding institution. Not a moment is wasted, and every moment is enjoyed. Students who arrive too early can sit in a well-lighted, cosy and warm room and read the newspapers and magazines, or can have their material needs satisfied in the canteen, where refreshments are provided at a nominal charge."

When all is said, however, the questionnaire supplies information about the interesting and very small minority of adults in attendance at evening institutes. But what of the thousands that never enter any place where education is provided? In this great city under consideration it was calculated that just under 5 per cent of the population between the ages of 17 and 40 participate in further education.† It is to the vast remainder that the net must be cast and appeal made if the adult education movement is to continue to make progress.

IV.—CONCLUSIONS.

(1) About one in twenty adult students between the ages of 17 and 40 participate in some form of further education in the city under consideration, there being more women than men students.

(2) Evening Institutes are attended mainly by ex-elementary school pupils.

**The Journal of Adult Education*, April, 1930, p. 183.

†As the 1931 census returns were not to hand the result is based on the 1921 figures, which were "weighted" proportionately. The percentage included students attending many adult institutes and, in addition, commercial, technical, and art school students, but is exclusive of activities of the Y.M.C.A., the National Adult School Union, and the Wireless Discussion Groups meeting in various places under the auspices of the National Council for Adult Broadcast Education.

(3) Students liking day schools appear much more likely to continue their education in later life.

(4) English subjects proved to be the most popular by students answering the questionnaire.

(In view of the greatly increased provision now made in Senior Schools for the various forms of science and craft work, a questionnaire to the present school generation might possibly furnish different results.)

(5) Students engaged in either mental or manual work do not, generally speaking, attend evening school with a desire to change from one kind of work to the other, nor do outdoor workers seek indoor work and *vice versa*.

(6) The tendency to monotony in present-day employment is felt by a large majority of students.

(7) While a large number of students go to evening school for improvement in their occupations there are many enthusiastic adults looking upon their institutes as a means of widening their outlook upon life. Some have an interest in a particular subject, others regard institutes as places for useful occupation of leisure time, others as a change from everyday work or for providing social amenities.

(8) More than half the students taking part in the investigation were members of a library, and although fiction was the most popular form of reading, there was much evidence of a higher standard being attained which included nineteenth and twentieth century literature and drama.

(9) Nearly all the students participated in sport or hobbies of some kind or other.

(10) About one in three students attended the cinema once a week but the only educational benefit derived was stated to be from geographical or travel pictures, historical films, and dramatized versions of well-known books.

(11) More than three-quarters of the students regarded wireless as a potent form of education ; talks, lectures, and music all being very popular.

(12) Apart from that provided in the Technical Colleges, there is a marked absence of science courses in adult education institutions, although an overwhelming majority of students expressed a wish to take part in a disinterested study of popular general science.

(13) The need for suitable buildings, modelled on the lines of the Educational Settlements, to provide greater comfort and more social life is, in the writer's opinion, the outstanding need of the adult education movement to-day.

RÉSUMÉ.UNE ENQUÊTE SUR LES INTÉRÊTS ET LES MOTIFS POUR L'ÉTUDE
CHEZ DES ÉTUDIANTS ADULTES DES COURS DU SOIR.

Le but de cette enquête était une tentative de découvrir les intérêts et les motifs pour l'étude chez des étudiants adultes qui suivaient les cours du soir dans une grande ville anglaise. On visita 7 de ces cours et 161 hommes et 211 femmes fournirent des réponses à une questionnaire, qui cherchait des renseignements sur l'éducation antérieure des étudiants, leur occupation actuelle, et leurs raisons pour suivre les cours ; l'étendue et la nature de leurs lectures, leurs sports, leurs occupations préférées, leurs visites au cinéma, leur intérêt au radio, pendant leurs heures de loisir. Il n'y avait point de cours de sciences naturelles dans les écoles visitées, quoique 78% eussent exprimé le désir de suivre un cours de science populaire. 74% exprimèrent le désir d'une vie sociale plus développée en rapport avec les écoles, à laquelle les bâtiments actuels, insuffisants ne sont nullement adaptés.

ÜBERSICHT.EINE UNTERSUCHUNG DER INTERESSEN UND DER STUDIENGRÜNDE
BEI STUDENTEN IN ABENDFORTBILDUNGSSCHULEN FÜR
ERWACHSENE.

Die vorliegende Untersuchung sollte die Interessen und die Gründe für das Studium bei erwachsenen Studenten an Abendschulen in einer englischen Grosstadt aufdecken. Sieben Institute wurden besucht und 161 Männer und 211 Frauen gaben Antworten auf einen Fragebogen, der Näheres über die frühere Bildung der Studenten, ihre gegenwärtigen Berufe, ihre Gründe für den Besuch der Abendschulen und den Umfang und die Art von Lesestoff, Sport, Liebhabereien, Kinobesuche, Rundfunkhören, u.s.w., die sie sich in ihrer freien Zeit erlaubten, erfragte. Es gab keine Klassen für Physik in den besuchten Instituten, obschon 78% den Wunsch äusserten, an einem Kursus für elementare Physik teilzunehmen. 74% der Antworten drückten den Wunsch nach mehr gesellschaftlichem Leben in Zusammenhang mit den Instituten aus, welches die jetzigen unzulänglichen Gebäude ganz und gar nicht bieten können.

THE CHILD AND ITS ACTIVITY WITH PRACTICAL MATERIAL.

By CHARLOTTE BÜHLER.

- I.—*Introduction.*
- II.—*The activities of children under six years with practical materials.*
- III.—*The development of constructive activities in children of school age.*
- IV.—*The nature of the play-material selected by children of different ages.*
- V.—*The use of the selected play material.*
- VI.—*The propensity of children to collect articles.*
- VII.—*The importance of practical work in mental development.*
- VIII.—*Summary and conclusions.*

I.—INTRODUCTION.

THROUGH the investigation of the laws of nature mankind has gradually acquired in the course of ages some measure of control over the material world, and has to a certain degree placed matter under his subjection and learnt how to use it. This conquest of the world has been slowly accomplished step by step in centuries of experimenting with matter.

To a certain extent every child goes through this process anew, and we render it easy for him. Rousseau advised waiting till the child made the discoveries for himself, but the path is too long, modern achievements too technical for such a procedure to be possible to-day. It is true that some boys of eleven or twelve years old will produce quite workable models of motor cars or other engines, even though they do not know the mechanical and technical laws governing their construction; but the majority of children learn these at a relatively early age. Schools, home, the entire environment, co-operate in teaching the natural sciences and practical information, so that a child has only to be interested in such matters to find knowledge all about him.

I am not intending in this paper to treat these special cases, but rather to deal with the more general point of the importance for mental development of the use of materials in practical work. After a brief recapitulation of my views in regard to the pre-school child I shall devote my attention especially to the child of school age.

But first, however, it is advisable to define more clearly what I mean by *material*. At first sight *material* might be taken to mean all workable matter in the narrower sense of the word, such as wood, iron, cloth, etc.

But in common speech we give material a much wider meaning. I have gathered new "material" for this article, and the teacher refers to his class as "good material." So in this article material can be any and everything in the world so long as it is or can be the foundation of a process which takes place upon it. Yet this process need not necessarily be construction, rather the manipulative use of the material which results in a new construction is a later development; the little child uses his material in a simpler way, but truly uses it, and it is for him material in the sense of this article.

II.—THE ACTIVITIES OF CHILDREN UNDER SIX YEARS WITH PRACTICAL MATERIALS.

The normal child living under normal conditions passes from one stage to the other in the first six years of his life. I have already given the details of this process elsewhere* and shall now only summarize them briefly so that they may serve as the introduction to what I am going to say later. By the time a child is six he is eager to produce creatively some object, making use of any material that he can get into his hands. The small child does not yet handle the material creatively. The difference between the two stages is well illustrated by the following story which was supplied from his own observation by a teacher, Mr. Fischer. He visited the manager of a mountain hut who had two boys aged $3\frac{1}{2}$ and 7.

The mother had just taken down the washing. She placed the clothes-pegs in a basket on a chair near the table in the kitchen. The father took one of the pegs during the course of the conversation and fastened it on the corner of the table. Seeing this the two boys filled the pockets of their aprons with clothes-pegs and used them to decorate the whole edge of the table-cloth. Afterwards they decorated their father's jacket, the belt of my coat, and the edges of their aprons in exactly the same manner. The game went on in this fashion for some time. Later they gathered all the clothes-pegs together again and each filled his apron. The elder boy kneeled on the sofa, placed all of his clothes-pegs on the table, and began to *build*. He put the clothes-pegs together and constructed a saw-horse. While making it he didn't speak a word, but when it was finished he clapped his hands for joy and asked me triumphantly if I knew what that represented. I answered him: "A saw-horse." He was pleased that I had recognized what he built and then took the clothes-pegs apart again. He began to build again and there followed consecutively a house, an airplane, and a motor car. Each time he asked me what it was and I answered. He always tried to put as many clothes-pegs as possible in his construction. The smaller brother had at the same time arranged his clothes-pegs in two cardboard boxes and fastened the

* See above all, Ch. Bühler, *Kindheit und Jugend*. Third Edition. Leipzig, 1931.

boxes to his wagon. While the elder brother built, he rode around several times through the kitchen, then stopped near the sofa by his brother and said: "Good-day! I'm the baker! Do you need anything?" The elder answered: "Yes, give me twenty rolls." The younger boy thereupon gave him some clothes-pegs out of his boxes, and said: "That costs 20 pfennigs." The elder then pretended to count money into his brother's hand and laid the purchased clothes-pegs on the sofa. He did not, however, use them in his building, but considered them as being rolls. The younger rode around several times more, even going out into the hallway. He then sold rolls again to his brother.

While the large seven-year-old boy uses the clothes-pegs for *building*, the small three-year-old plays a game of pretence with them. The elder constructs something, the younger on the contrary gives the clothes-pegs an invented character and uses them to represent rolls.

Thus the activity of the elder boy differs in two ways from that of the younger: (1) He *makes* something with his material, which the younger does not, and (2) he attempts to discover through his activity in what way the clothes-pegs can best be used; he has in view an *appropriate* use for his material. We call this a *specific* use of the material. The younger, on the contrary, deals with the clothes-pegs *unspecifically*, i.e., he uses them for a purpose for which they are as well or as ill fitted as any other material present in a quantity of small pieces; he has not therefore developed the desire to construct anything with his material, nor the power to treat it as having specific qualities. These two tendencies are quite distinct and do not necessarily develop together. It is important to notice further that at the beginning both boys simply play about with the material; this is an experimental stage which is regularly found when children first begin to use new material.

With children aged 2-4 make-believe games are very common. They are not the earliest games to be developed, but they are particularly characteristic of this age. In them the child is interested solely in its own activity in function, and the material is used simply as an excuse for this activity, especially for the activity of a definite bodily movement. This activity is practised, repeated and carried out with pleasure. The material that is employed is not noticed at all. This has been most precisely studied in the visual movements of children in the first year of life. It means that the material that gets into the hands of the child is not looked at. However, the child in this first year studies most earnestly, so to say, the material that it possesses in the form of his own body, his own capability of movement.

The following are the steps in the development from this functional activity to constructive work. The child creates first of all with any

material a form of some kind. At the next stage the child proceeds to the naming of this creation, and does this *after* he has made it. Finally, he begins his activity with a definite purpose already in view, and plans to make this and that definite object. Now for the first time his creation becomes a representation of something.

III.—THE DEVELOPMENT OF CONSTRUCTIVE ACTIVITIES IN CHILDREN OF SCHOOL AGE.

What does the child between the ages of 0 and 6 learn from his activities with materials and what new is added in the school age?

Summarizing we can answer the first question :

(a) The child proceeds from unspecific to specific manipulation of the material ;

(b) He learns to set himself a goal and to plan his activity with materials carefully. In other words, he learns the art of production.

Further, as Karl Bühler has shown in his researches on the *hedonalgic* reaction* the child progresses in this development from the primitive forms of pleasure in activity to pleasure in creation, a specifically human pleasure experience which first appears with the construction of an object. In contrast to the pleasure of activity, in which we pour forth our energy in movements, we have in the pleasure of creation the characteristic satisfaction of transferring our energy to the material, and of impressing upon it the stamp of our individuality. We generally express this by saying that we express ourselves in the material. And in this expression of ourselves we expand beyond our limits and leave a more or less permanent impression of ourselves in the material. With this are connected three important experiences characteristic of mankind, the importance of which we will discuss again later : while he is active with the material, man surrenders himself to it, masters it and puts something new into the world. Surrendering one's self, mastering the material, and producing an object are, one may say, such definitely human experiences that without them one is not human. These experiences, of whose importance we shall again speak, have normally fallen to the lot of the six-year-old child.

What remains for him to learn if he has already progressed so far before arriving at school age ? Quite a lot, and in a series of steps.

* K. Bühler, *Die geistige Entwicklung des Kindes*. Sixth Edition. Jena, 1930.

The child of school age is concerned with two problems in relation to construction. He sees the world around him with the eyes of a practical person, and asks : *What can one use ? What can one make ?*

All possibilities of procuring material, from the hunting up of all kinds of rubbish in the house and street to the collection of the most abstruse objects, interest the school child, and so do all problems and possible solutions when he is engaged in making anything.

Detailed researches on school children conducted by Hildegard Hetzer—who has very kindly placed at my disposal her unpublished material—as well as observations which Lotte Danziger and Paul Lazarsfeld with a group of co-workers collected for me in Vienna, confirm very exactly these theses that I have just advanced. Observations were made in schools, inquiries held with the help of the parents, adolescents were interviewed and most recently observations were made in families.

IV.—THE NATURE OF THE PLAY-MATERIAL SELECTED BY CHILDREN OF DIFFERENT AGES.

As to the question *What can one use ?* there is a body of evidence collected by H. Hetzer in a research on about 150 children, whose play habits were investigated partly by observation and partly through questionnaires. Only one of all these children does not play with home-made toys, and in regard to most of them the mothers are of the opinion that it is better for the children to be without bought toys than without any other of the things usable for play. Interesting are the lists of the home-made play objects and their distribution amongst the separate age groups.

Children from 1-14 years of age were considered in approximately equal distribution of boys and girls with respectively a certain numerical preponderance of school children.

Let us distinguish the following groups of objects :

- (1) Objects of use, such as household utensils, things used in house and garden, furniture, books.
- (2) Worthless material such as discarded and broken objects of use, waste material, natural raw material.
- (3) Plants and animals.

From these observations I have been able to get the following results, grouping our children together into two groups of from 1-6 and from 7-14, and giving the percentages to the nearest whole number :

PERCENTAGES OF CHILDREN PROCURING PLAYTHINGS FROM THE THREE GROUPS OF MATERIALS.

	Boys.	Girls.	Boys.	Girls.
	Age 1-6 years.	Age 1-6 years.	Age 7-14 years.	Age 7-14 years.
Material Group (1)	60%	61%	37%	28%
Material Group (2)	30%	34%	52%	38%
Material Group (3)	10%	5%	11%	34%
	100%	100%	100%	100%

The interesting result appears that the relationship of the use in play of ready-made articles to worthless material is exactly reversed in the school period as opposed to early childhood. And this indicates that the productive or constructive activity has made most important progress : it has passed from the mere grouping or imaginative reinterpretation of ready-made objects to attempt real formative activity on raw materials. Attempt, I say, since we do not yet know what is really made out of the rubbish and waste material. More of that later.

I should like to give some idea of the abundance of material gathered and used by the children. A glance into the long lists of materials used shows :

Pots	4	Hand-cart	3	Books	1
Spoons	5	Carriage	1	Envelopes	1
Saucer	1	Flower pot	1	Postcards	1
Comb	1	Wooden sticks	9	Paper	1
Pot lids	3	Empty boxes	5	Playing cards	1
Egg beaters	2	Empty tins	6	Old time-table	1
Bowls	2	Bobbins	2	Crock	1
Ironing boards	2	Cigar boxes	2	Buttons	3
Cleaning box	1	Old paper bags	1	Old pots	1
Carpet beaters	2	Empty cartridges	1	Water	6
Clothes-pegs	3	Old bottles	2	Stones	5
Pint pot	1	Worthless paper money	1	Sand	5
Hand brooms	2	Scraps of cloth	1	Sea shells	3
Brushes	1	Waste fur	1	Sod	1
Kitchen measure	1	Crumpled paper	1	Hay	1
Cups	1	Porcelain cup	1	Straw	1
Sieve	1	Old clockworks	1	Sheet iron	1
Wash basket	1	Wooden cup	1	Boards	1
Clothes line	1	Briquettes	1	Bricks	4
Rake	1	Wooden boxes	3	Grass	2
Watering cans	2	Barrel cover	1	Apples	1
Baskets	2	Newspapers	3	Pears	2
Wheelbarrow	1	Catalogue	1	Pine cones	1
				etc.	

Moreover, we have supplemented the above table of observations with a table of the comparable data in the three books of observations on Bubi Scupin.*

It shows the correctness of our earlier data as well as the excellence of Mrs. Scupin's observational material, that we find the closest agreement between the numbers for Bubi and our earlier table.

The corresponding numbers for the three groups of material used by Bubi run as follows :

	<i>From 1—6 years.</i>	<i>From 7—14 years.</i>
Material Group (1)	61%	17%
Material Group (2)	22%	51%
Material Group (3)	17%	32%
	100%	100%

V.—THE USE OF THE SELECTED PLAY MATERIAL.

Our next question is, what happens with the material so brought together? We said that the question, *What can one possibly make?* occupies the mind of the school child at least as vividly as "What can one use?"

Observations were conducted to answer this question also. A number of children were individually and continuously observed by psychologists friendly with them. There is, for example, the case of a seven-year-old girl, Hertha P. In the course of two months the following *productive activities* were observed in her :

Lacking a straw, she made a little tube out of paper for blowing soap bubbles; kitchen stove out of a shoe box; cooked red gelatine as soup; made a kitchen clock out of cardboard, similar to one drawn at school; made a hole in a bark boat that a boy had given her; fetched a branch which could be used for pole-vaulting, for drawing serpentine lines, etc.; made clothes for the doll; kept small boxes as shops in her play cupboard.

Thirty drawings, viz., six times, house; three times, children playing in the open; twice, arbour, pump, ship on the water, Easter rabbit scene, garden, landscape; once each, town hall (trumpeter in front of it), house in the woods, auto, excursion to the Riesengebirge, purchasing at the bakers, at the cobblers, rainy weather, ducks on the water, Punch and Judy.

* *Bubis erste Kindheit*, 2 volumes, Leipzig, 1907-10; *Lebensbild eines deutschen Schuljüngers*, Leipzig, 1931

In sand : flower garden, castle, buttermilk tower of the Marienburg, motor car (nine-seater), played millers in the sand ; (played in the sand usually with schoolmates as part of make-believe games).

Paper : coverlets through folding and cutting, aviators, Zeppelin under the directions of an older boy ; cardboard tray for the frog pen at school.

Plasticine (less liked) : baskets, bread. In comparison with these numerous productive activities make-believe games are already relatively rare ; only ten such games were counted in this same period. It is only movement games that surpass construction games in frequency ; all practical life situations begin to interest the small girl. She does the following domestic tasks and discusses the following problems :

Looks after the bird, helps in the garden, runs errands, helps in the kitchen, polishes the floor.

Deliberates what to do with the money that she has received as a reward.

Recovers a ring that has fallen into a rain barrel (bails with her hand, fetches a bucket, lies down flat in order to be able to reach to the bottom of the barrel).

Fetches a branch as a support for a tree in the garden colony.

Suggests means to mend a broken vase.

Constructs a fly catcher out of snapdragons.

Draws a plan for a new arbour. (" The rooms must be very small in the first construction.")

Remarks on how a neglected garden which she passes should be treated.

Suggests means to make children dislike jumping over the hedge.

Deliberations about the life on a ship. (" How is a marriage celebrated there ? ")

Participation, one can say, in all the life questions that occupy the environment ; co-operation in the solving of practical problems.

It would be interesting now to know when this interest in productive activity culminates. Experiments with boys between eight and fifteen years of age show clearly that it reaches its climax between the ages of eleven and twelve.

One could glance in this connection at the lists of wishes of children and at the presents given them by their parents. It has been shown by an inquiry on this point that while the wishes for constructive material at all ages is at least 25 per cent of all wishes, the presents never amounted to more than 10 per cent, and were thus in general not adequate to the children's construction needs. It would be very valuable if teachers could give parents some instruction in the extraordinary importance of the simplest kind of constructional material for children. It could be easily done and would be much welcomed.

A little episode told in the biography of Fritjof Nansen is instructive. The ten-year-old boy went to a country fair with his brother, and for this

once they had money in their pockets for amusement. To the great astonishment of their parents the boys came home loaded down with tools of all kinds. They preferred, instead of enjoying the pleasures of the fair, to buy their long desired tools for handicraft. The parents, touched and probably also somewhat shamed, did not wish that the boys should be cheated out of the proper children's amusements at the fair because of their commendable interests, and sent them away with money again. The boys wandered once more down the long road and came home the second time loaded with tools.

VI.—THE PROPENSITY OF CHILDREN TO COLLECT ARTICLES.

The interest in collecting that we observe in all children of a certain age can naturally be discussed here. One must differentiate between the general collecting of any and everything for possible use—one needs only to think of the contents of the pockets of a ten-year-old boy—and the special collecting interests. I have for some time systematically studied the contents of the pockets of my eight-year-old son, as did also Mrs. Scupin. The list for one day contains, for example :

(1) 1 grey-black, sausage-shaped, twisted form with a giant knot—the handkerchief ; (2) a thick roll of string ; (3) a half-rusted pocket knife ; (4) an empty match box ; (5) a piece of solder ; (6) the bulb of a flashlight ; (7) a shoe lace ; (8) a pencil ; (9) two crayons ; (10) four foreign stamps ; (11) two carpenter's nails ; (12) steel pen ; (13) a wrinkled advertisement of Liebig's meat extract.

" I still need all of that ! " Hot tears as a part of the pocket's contents were confiscated . . . The whole class seems seized with the bartering fever—everyone is exchanging. And sometimes they are the strangest objects. The canary bird, while moulting, lost a long wing feather. Sonny wanted to keep it as a souvenir of " Pieps." But then he got a better idea : " You know, L. hasn't got a canary bird, so I'll simply say to him, ' Look, here is a foreign feather of a bird from Africa ! ' Then he'll think it's something valuable and maybe he'll give me a rare stamp for it."

This type of collecting ended with my son between the ages of eight and ten.

We are at the present time making extensive researches in Vienna about special collecting interests. There are to be distinguished here productive and non-productive interests in collecting. As productive, I define the collecting of material with which one at all events can do something ; starting with silver paper, the object collected by poor children, which they hope to be able to sell, up to the collecting of stamps, which

can be systematically arranged, or of material for handwork, or even of money in the savings bank so as to be able some time to fulfil a wish. As non-productive collecting I define the accumulation of any kind of material at all, which is only there in order to be counted and looked at now and then because there are now so and so many pieces more, as for example, pictures, postcards, and transfers. The questioning up to now of 133 boys and 185 girls between the ages of seven and thirteen reveals the following large number of collectors :

NUMBER OF COLLECTORS AMONGST THE CHILDREN OF FROM 7-13 YEARS
OF AGE (IN PER CENT).

<i>Age.</i>	<i>Boys.</i>	<i>Girls.</i>
7— 8	84%	86%
8— 9	80%	86%
9—10	85%	84%
10—11	93%	84%
11—12	100%	91%
12—13	97%	92%
13—14	93%	78%

VII.—THE IMPORTANCE OF PRACTICAL WORK IN MENTAL DEVELOPMENT.

I should like now to touch on two very important groups of facts before I proceed to my concluding observations. In connection with all that has been reported I must emphasize the very great importance of the free development of interests in the choice of work material, not only for the creative work of children, but for that of every human being as well. Life does not consist merely of pleasure, and we must all dutifully learn to do and to accomplish things that are not pleasant to us. But where one is dealing with productivity, and where one wishes to further production, one must always allow for a certain amount of free play in the activity, and this can be given with most of the forms of activity which are not exactly factory activities. The following little experiment was undertaken by H. Hetzer :

In the third class of a school with 54 eight to nine-year-old boys and girls, three handicraft periods were used for the experiment.

In the first period the children were given a free choice of material and a free choice of scenes out of a story that had just been read. As materials there were at the disposal of the children coloured paper, colours for painting, crayons, chalk for drawing on the board, and plasticine.

In the second period painting with water colours was prescribed and the problem was given ; a definite scene out of the story was to be drawn.

In the third period the material, namely, coloured paper, was prescribed, but a free choice of scenes was given.

Results.—In the first period twenty-five children apiece selected coloured paper and water colours. All children came to some kind of a result. It was eight times observed that they " didn't know exactly how to go on " so that help was necessary. The period seemed too short to all of the children without exception. Only one disciplinary difficulty arose through two children disturbing each other.

In the second period : eighteen times, " I don't know how to start," refusals to work and the like, also attempts to try and get another problem or to use another material. Only forty-six children came to some result, the others handed in purposely smeared or unfinished papers. Ten questions and deep sighs, " When is the period finally up ? " Eight disciplinary difficulties.

Result of the third period : fourteen times not knowing how to begin, refusals, etc. Fifty children reached some result. Six questions and sighs, " When is the period over ? " Six disciplinary problems.

This is a small experiment, but it indicates very clearly some points that would be well worth further observation and research.

And now, finally, the question : What consequence and effect does the activity with material really have on the development of the child, and indeed on the development of mankind. Although at the beginning of this paper I defined " material " in a wide sense, I have in the main used it in the narrower sense of that which is workable, and I have done this deliberately. It is true that any and everything can become material for our activity : our own bodies, all objects in the universe, other people ; and yet for the child, as soon as it has learnt to control its body, it is practical workable material which is really *the* material with which it constructs, and in creating learns.

A fact which must be placed before all others is that free activity with material has a general practice value, a general intellectual importance for the child. We have been able to determine this in a very exact manner, not, it is true, for all ages, but for children in early childhood. Martha Sturm and Irma Gindl* investigated this problem by comparing institutional children and family children from the point of view of their material possessions, their free daily playtime and their state of intellectual development. It is a known fact that one of the main defects of closed up institutional life is that the children there get only certain,

* Publication in preparation : *Anstaltskind und Familienkind*, Hirzel, Leipzig.

relatively few materials for activity and do not have those free possibilities of collecting and gathering material which even the poorest family child has at home, in the garden and on the street. Care in other respects cannot, in our opinion, make up for this great disadvantage. In this research institutional children and family children of the same class of society were compared. Even when one compares especially poor and uncared for children, who own practically no toys, but can run about freely in house and street, with institutional children in respect to their general intellectual development, the relationship is nearly one to two in favour of the child of poor family. The difference is even greater, about one to three, in the ability of handling different kinds of material such as are used in our development tests* The absence of practical activity, the lack of experience in all practical things of life, seems therefore, one of the important factors in determining the whole level of development of the child.

Let us pass from the beginning to the end of the development of childhood. We can make for the period of puberty a further decisive statement about the effect of activity with material, on the basis of interviews with adolescent workers. Alexander Gan is now conducting this research in Vienna with Paul Lazarsfeld. The material consists of sixty interviews made in day rest rooms for untrained or momentarily unemployed adolescents, as well as in industrial night schools. One interesting fact emerges from this very extensive research, and completes in a new direction the important investigations of Lau, Dehn, Kelchmer, etc., with trained and untrained adolescent labourers. The difference between the adolescent untrained worker and the adolescent apprentice has already been very explicitly worked out in these investigations. We know from them, for example, how unfavourable the situation of the untrained worker is for the formation of a vocational consciousness, of vocational interests, etc. But from Gan's interviews we learn an additional fact that sheds new light on those experiences that arise from handling material, and that is the point with which we are dealing.

We have found out that those adolescents, who as apprentices and workers had the opportunity of working long enough in one and the same line with one and the same material, develop a certain inner relationship to their vocation even though they are not in the real meaning of the word interested in this work, talented for it, or inclined to it. The adolescent who is talented, interested and active in a certain specialized field does not arrest our attention so much as that average type, which really does not seem bound to or called by any particular activity. If a

* See Bühler-Hetzer, *Kleinkinder tests*, Leipzig, Barth, 1932.

youth can learn and keep a certain kind of job long enough, a feeling of belonging to his vocation develops in him through experience with his material. That is what seems to us particularly worthy of our observation and interest. That the talented person, one firmly resolved to follow some specialized line, is able to master his material and through that attain self-assertion and competence was never as much a problem as the rôle of the average type which does not seem to have a calling for anything in particular. It is shown here that by a reversion of the process, so to say, through induction in the growing familiarity with a material, a consciousness of belonging to a definite vocation can arise, which consciousness the specifically talented youth has as a result of inner determining factors. "Man grows according to the height of his aims," says the German proverb and establishes therewith a similar induction relationship to that which we have found in practice.

The mastering of life through the consciousness of a definite ability and of fitting into a definite place in society can, even without definite talent and definite interest, be produced by continued application to a certain kind of work.

Human life reaches its highest point in two activities as we learn from a detailed study of the course of human life. In one, the individual, as well as mankind in general, strives for domination of the universe—for the technical and intellectual mastery of all the conditions under which we live. But strangely enough—and this is at the same time an anti-movement to the first, rather predominating to the end of life—man also has the reversed need of giving himself up and entering into a larger unit. While the community character of this deed, the whole into which we enter with our labour and which we help create, is first comprehended in puberty, the experience of mastering material and of giving one's self in creating is already granted to and is possible for the creating child. Through mastering his body movements and mastery over material, through using his own energy, his will and ability, he reaches with his small creations the threshold of those great human experiences in which our human life is able to raise itself, to bring itself to a climax and to fulfil itself: mastery over matter and sacrifice of ourselves.

VIII—SUMMARY AND CONCLUSIONS.

The present investigation is a continuation of experiments already published in *Kindheit und Jugend*.

By the time a child has reached school age he is capable of producing definite results by creative work with practical material and has ceased to use objects merely for purposes of make-believe.

The child of school age is eager to make things and therefore always on the look out for waste scraps of all kinds that he can use. In this he differs from the younger child who uses objects that he can find ready made about the house.

These materials are used for constructing all manner of things for use, and the child's interests are predominantly practical.

To provide himself with materials the child is constantly collecting. Both the tendency to construct and this collecting reach their climax at about eleven years of age.

For full satisfaction the child should be given freedom in his creative work.

This practical work is of great importance in intellectual development, and children brought up in an institution, where they have little access to materials for such work, appear to be retarded intellectually when compared with children, even from a poor home, who yet have access to it.

Interviews with adolescent boys show that persistence in one type of work, with the consequent mastery of technique, produces a feeling of stability and of a place in the social order which is lacking in boys who have not had this training. This occurs even when the boys had no particular aptitude for the work.

RÉSUMÉ.

L'ENFANT ET SON EMPLOI DES MATIÈRES PRATIQUES.

Le jeune enfant de un à six ans, en choisissant ses jouets, montre une préférence pour les objets utiles, par exemple les ustensiles domestiques, les meubles, etc.

L'enfant d'âge scolaire (au-dessus de sept ans) cependant regarde son milieu d'un point de vue pratique : il collectionne des matières de toutes les espèces, des matières pour la plupart sans valeur, objets cassés, restes d'étoffe, etc., et se demande ce qu'il pourra en fabriquer. Cette préoccupation atteint son maximum chez les petits garçons de onze et douze ans.

On devrait laisser à l'enfant le choix libre de telles matières pour le libre développement des intérêts. Une telle activité libre favorise le développement intellectuel général.

Des entrevues avec des ouvriers adolescents sans aptitude prononcée pour leur travail démontrèrent qu'après quelque temps il se développait chez eux une certaine attitude vis à vis de leur travail qui n'était pas évident chez d'autres qui changeaient souvent de travail et n'avaient acquis de dextérité dans aucune activité spéciale.

ÜBERSICHT.

WIE DAS KIND MIT STOFFLICHEN DINGEN UMGEHT.

In der Wahl von Spielsachen zeigt das kleine Kind vom ersten bis zum sechsten Jahr eine Vorliebe für nützliche Gegenstände, z. B. Hausgeräte, Möbel. u.s.w.

Das Kind im Schulalter (über sieben Jahre) aber sieht seine Umgebung von einem praktischen Standpunkt an: es sammelt allerlei Material, hauptsächlich wertlose Dinge wie gebrochene Sachen, Abfall, u.s.w., und ist neugierig, was es daraus gestalten kann. Dieses Interesse erreicht seinen Höhepunkt bei Knaben zwischen dem elften und dem zwölften Jahr.

Wegen der freien Entwicklung von Interessen sollte man dem Kinde freie Wahl von solchem Arbeitsmaterial gestatten. Solche freie Tätigkeit ist der allgemeinen Entwicklung günstig.

Besprechungen mit erwachsenen Arbeitern mit keiner ausgesprochenen Begabung für ihre Arbeit zeigten, dass sie im Laufe der Zeit ein gewisses inneres Verhältnis für sie gewannen, welches bei anderen nicht zu finden war, die ihre Arbeit öfters wechselten und keine Fertigkeit in irgendeiner besonderen Beschäftigung entwickelt hatten.

THE EFFECT OF CREATIVE WORK ON ÆSTHETIC APPRECIATION: AN EXPERIMENT IN THE TEACHING OF POETRY.

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- I.—*Introduction: the nature of the problem.*
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I.—INTRODUCTION: THE NATURE OF THE PROBLEM.

THE idea for this experiment arose out of certain aspects of current educational theory and practice. Within the limits of the present century there has been discernible everywhere a movement towards a new emphasis in the teaching of the so-called "artistic" subjects. Broadly, this movement has meant the shifting away from the mere acquirement of technique and of "knowledge about" the work and towards a fuller enjoyment or "appreciation." In practice, methods with this aim in view have been adopted in the teaching of art, of music, and of poetry. In the first of these there has been some attempt to promote the enjoyment of visual art by organizing visits to picture galleries, for which the pupils are prepared by preliminary talks and which are followed by discussion of the particular excellences of colour and design in the picture seen. As for music, titles of recently-published books, taken almost at random, speak for themselves. "The Enjoyment of Music," "Learning to Listen," "The Listener's Guide to Music," "Music and its Appreciation." The work here of Mr. Stewart Macpherson, Mr. Percy Scholes, and Sir Walford Davies, among many others, has influenced the teaching of music in schools so greatly that the change in method might be described, without exaggeration, as a revolution. The old tedious labouring at notation and theory, and at the finished performance of a very small number of songs, have not indeed been entirely swept away; but every-

where there are healthy signs of their having given place to the presenting of music as something to be listened to primarily and enjoyed. But it is in the world of poetry, perhaps, that there has been most talk about training appreciation, and it is in the teaching of this subject that there seems to have been much looseness in the use of the word and considerable vagueness as to the methods by which appreciation can be fostered. It seems to have been generally accepted, without adequate investigation into the question, that it is possible to "train" appreciation of poetry. And certain methods have been confidently adopted as furthering that end, again without any reliable evidence as to their superior value. Hence arose the problem: How far can the school foster enjoyment of poetry and what is the best means to that end?

This problem was further delimited and at the same time given a clearer intention by another movement in the artistic side of education which seems to have developed *pari passu* with the above but not generally in explicit relation to it. This second movement is that towards creative or expressive work in art, music, and poetry. The methods of Professor Cizek in art, the spontaneous answering of phrases and the composing of simple "sentences" in music, the making of verse from simple line-matching to the writing of sonnets; in all these it has seemed of first importance that the pupils shall do work of a creative character. The possible relation, then, between these two movements and especially how far the latter might influence the former presented an interesting field of enquiry. And the problem for the present experiment became: How far does the making of verse foster in the pupil an appreciation of great poetry? Although exercises in verse-making are now so widely recommended, they seem to be valued rather as improving composition than as affecting taste. The report on "The Teaching of English," published in 1921, while asserting that exercises in original verse afford the best training in composition makes no mention of appreciation, and similarly Mr. Hardress O'Grady suggests the writing of triolets and sonnets rather as improving style than as promoting enjoyment.* On the other hand, the Board's "Suggestions for Teachers" of 1927 explicitly states that "creative work, even though of no particular merit in itself, is of great help in developing the power of critical appreciation." And a similar position is taken by Mr. Greening Lamborn when he says that "all the practical results of verse-making are of quite secondary importance. The real, important result is the increase . . . in the appreciation of good literature." "The best reason for teaching boys to write is not that they may become authors but that they may love good

*Hardress O'Grady: *Matter, Form, and Style*. Preface and pp. 79-82.

writing."* This is positive enough, but while it is impossible to doubt that Mr. Lamborn's boys took a particular pleasure in their English work, one wonders how far he has verified his assumption that this was the direct and unequivocal result of a certain method, among a multiplicity of other factors : and whether, in any case, this result has followed for the boy who does not take naturally to verse-making equally with the boy who does. In discussing this question with teachers of English using the creative method I have found a tendency to admit that, whereas a child with a gift for verse-making profited by the exercises, the child with no such gift was untouched by them. Another aspect of the general problem was indicated here.

II.—THE CONDUCT OF THE EXPERIMENT.

The practical problem was two-fold : first, to give a suitable course of training in verse-making to a group of subjects with adequate controls, and, secondly, to test the effects of this work upon appreciation. The subjects for the experiments were fifty-six women students from a training college for teachers. They were divided into two equal groups—an experimental group to form the subjects of the course in verse-making and a control group for purposes of comparison. It was, of course, necessary that these groups should be, as far as possible, of parallel ability, especially, as it seemed to the experimenter, of equal literary ability. Tests were therefore chosen, mainly of the types included in the commoner systems of mental tests but selected for their literary bias. They included an opposites tests, an analogies test, tests of reading vocabulary, and of facility with words,† a definitions test, and a completion test. They were given in two parallel series, on two different occasions, and the reliability coefficient was as follows :

$$r = .85 \pm .026.$$

In addition to these, the first series of tests of appreciation, described fully below, was given ; and a considerable degree of correlation with the general tests was discovered :

$$r = .55 \pm .066.$$

*Lamborn : *Expression in Speech and Writing*, p. 87.

†On the lines of that used by Miss Hazlitt in testing students of Bedford College :

- (1) Write in the spaces provided—
 - (a) As many names of objects as you can.
 - (b) As many names of colours as you can.
 - (c) As many words descriptive of sounds as you can.
 - (d) As many names of authors as you can.
- (2) Write below each of the following names as many words descriptive of the thing it denotes as you can—
 Test ; remorse ; moon ; war.

On the basis of the total scores for the three sets of tests the two parallel groups were formed.

Two courses of work were planned, for the experimental group one consisting very largely of creative work, the other following the usual conventional methods of reading and discussion. Care was taken to make this difference in the method of teaching the sole difference in the treatment of the two groups. For both a course of thirty-three lessons was given, one class a week during an entire college session ; the classes were taken at the same hour, 7 to 8 p.m. Both courses were taken by the experimenter. Although other English work was being done during this period as part of the ordinary college course, this was the same for both groups and taken by the same lecturer, *not* the experimenter. It was, therefore, unlikely to be a disturbing factor.

The course taken with the experimental group should, perhaps, be outlined. The exercises were graded in difficulty, briefly as follows:

(1) *Exercises in Rhyme.*

Such as finding as many words as possible to rhyme with a given word or completing a couplet by adding the rhyming word.

(2) *Exercises in Rhythm.*

(a) Representing lines of verse by a musical rhythm—e.g.,

The way was long, the wind was cold.



(b) Writing lines to a given rhythmic pattern—e.g.,

Sweet is the sound of the larks in the sky.



(3) Matching Lines.

The first line of a couplet is given, the second supplied by the student.

(4) *The Ballad Stanza.*

In the earliest exercises the first line of the stanza is given, later the subject only was suggested or the student was left to choose her own subject.

(5) Practice with various stanza forms.

From quatrains of the " In Memoriam " and " Omar Khayyam " pattern to longer and more complicated stanza-patterns. In some cases the first line was given, as in the following :

I know the dear enticements of the May (given)

The hawthorn bloom, the meadows painted gay

The cuckoo's sweet insistence ; yet I know

A grief of heart that none of these allay.

(It was interesting to notice the tendency, often so strong in later adolescence, to emphasize the woes and the conflicts of life!)

(6) *Exercises with Figures of Speech.*

Exercises with figures of speech followed, finding similes and metaphors, writing paragraphs or stanzas personifying this and that, or giving a description of place or person or scene.

(7) *Experiments with a Variety of Forms.*

Here we attempted complete short poems and some students were surprisingly successful with the triolet, the rondeau, and the villanelle. Labours were lightened by a period devoted to the writing of parodies of various well-known verses, chosen because they invited, and were not outraged by, this treatment. Finally, we made a bold assault upon the sonnet, but here most were bound to acknowledge failure, realizing how intractable words may become in their refusal to be forced into a neat arrangement of fourteen lines of given length and rhythm and rhyming thus and thus.

It will be realized that this course revolved exclusively round the exercises in composition and that the reading of poems and discussion of their forms were included solely as a means to an end. The course taken with the control group, on the other hand, consisted entirely of reading poems, chiefly from Palgrave's "Golden Treasury" and an anthology of modern verse, followed by discussion of their form, the use of imagery, beauties of expression and the like, with careful avoidance of any kind of exercise in composition. The experimenter, being more accustomed to this kind of presentation, felt indeed that she was more effective as a teacher in this than in the alternative course.

III.—THE TESTS OF APPRECIATION.

The second and more difficult aspect of the experimenter's two-fold task was the testing of the progress made by the two groups in ability to judge verse. From the beginning the difficulty of finding adequate tests of appreciation was recognized. The ordinary school examination still tests "knowledge about" poetry rather than discrimination and enjoyment of the best; and even such questions as do aim at estimating the latter, as, for example, questions demanding the evaluation of a poem, fail to admit of exact scoring. The suggestion for a type of test which seemed to demand judgment or discrimination of poetic values and, at the same time, to admit of a precise numerical estimate, was given

by the poetic discrimination test in a "popular" work on mental testing.* In this test the subject is required to range in order of preference three stanzas, one of which is selected from a recognized poet, the others being false or inferior versions of this original. Most of the sets of stanzas given were unsuitable for this experiment either because the original stanza was likely to be familiar to the students or because the differences of merit of the three versions were so great as to make the ranking of them too easy a task. The experimenter, therefore, proceeded to construct a large number of sets of stanzas upon this plan, taking in every case one stanza from a recognized poet, not too familiar, and composing the other two versions aiming at a less and a greater degree of inferiority to the original. Twenty-one such sets were constructed altogether and submitted to the judgment of sixteen persons, all with some claim to be considered competent judges of poetic values, including lecturers on English in universities and training colleges and poets of accepted standing. From these sets only ten were selected for actual use; all sets in which fewer than ten of the sixteen judges showed a consensus of opinion were rejected. One of these sets is given as an example of tests of Type A in the appendix.

A second type of test (Type B in the appendix), closely resembling the former, was obtained from Abbott and Trabue.† Here there were four versions in each set, the original and three others in which the weakening took a definite character; in one there was "falsifying of the emotion," a sentimental version; in another reducing of the poet's imagery, a prosaic version; and in the third the metre was altered, "making the movement either entirely awkward or less fine and subtle." From these four versions the subject has merely to select the best. Fifteen only of the twenty-six sets given by the authors quoted were considered suitable to these particular subjects.

A third type of test (Type C) was constructed by selecting five stanzas, all original stanzas from recognized poets and unrelated in subject. They varied markedly in poetic value, from verse of the highest quality to mere doggerel. These were again submitted to the judges and from them were chosen those upon which a consensus of opinion was shown. A fourth type of test (Type D) consisted in the comparison of a short "original" passage with a mutilated version in which the images and epithets were deliberately weakened. The suggestion for this was given by Dr. Hayward's experiment to discover which children

*Stockbridge and Trabue: *Measure Your Mind*.

†Abbott and Trabue: *Exercises in Judging Poetry*.

would prefer. The lines he used for comparison were the lines from "King Lear":

"O let him pass; he hates him
That would upon the rack of this tough world
Stretch him out longer."

and his own weakened version:

"O let him pass; he hates him
That would amid the griefs of this sad world
Delay him longer."*

From the large number of tests obtained three series were arranged, one to be given at the outset of the experiment before the courses of training were begun, a second to be interpolated halfway through the course, and a third series to be used as a final test of judgment. The series were parallel in form, each comprising four sets of Type A, five sets of Type B, two sets of Type C, and three sets of Type D. These tests were not considered entirely satisfactory, and it seemed to the experimenter that the most interesting problem which emerged from this enquiry was the problem of tests. Can appreciation or æsthetic responsiveness be tested, and, if so, by what type of test? The question had been insistent during the construction of the tests and was emphasized further by the comments of some of the correspondents who standardized them. These comments were the more interesting because entirely unsolicited by the experimenter, who was careful not to provoke them by any question or expressed doubt. One of the chief difficulties in comparing stanzas lies in the extreme complexity of the processes involved. In a recent experiment upon children† the subjects were asked to say which of six poems they preferred, and to give reasons. It is shown that the children's judgments referred to no fewer than nine different factors such as subject-matter, language and form, effects on feelings and impulses, imagery, associative references to personal experience, and physiological effects. University students, in another investigation,‡ reported that the following factors entered into their appreciation of poetry read aloud to them: Images, continuity of the thought, a strong and unified emotion or mood throughout, rhythm, sound of the words, flexibility of the reader's voice, suggestions of meaning and emotion conveyed, relevant experience. It will be seen that, although some of these factors such as rhythm and the sound of the words seem to be integral to the poem and, in a sense,

*Hayward: *The Lesson in Appreciation*. (Macmillan, 1917, p. 89.)

†Linette Feasey: *Children's Appreciation of Poems*.—*British Journal of Psychology*, 1927.

‡Olive Wheeler: *Analysis of Literary Appreciation*.—*British Journal of Psychology*, 1923.

a "constant" for all readers, others are fortuitous and fluctuating, depending upon chance associations from previous experience or upon the mood of the moment. Much light was thrown upon these personal and variable factors by the judges of the tests; among their comments the following may be noted: "I am prejudiced in favour of this stanza, which is an old love." "Of course, the personal factor must count." "Preferred because of what may be quite a passing, personal preference for the simple." "I reacted *subjectively* against them." "One realizes what an extremely personal matter taste is." And, in addition to this difficulty of chance association and personal prejudice and passing mood, the comments showed how, in so complex a process as the judging of verse appears to be, one or other of the numerous factors entering into it may be so emphasized by an individual reader that different readers can hardly be regarded as passing judgment on the same thing. Take the following as examples: "These stanzas are classically perfect . . . they have a formal perfection, an exquisite economy of words." "Placed first for the greater sonorousness and sweep of the rhythm." "Beauty of vowel music was my main criterion." "Padded and meretricious." A relatively trivial factor may influence judgment, as shown in this comment: "My grammatical soul protests against the use of the word 'except' in this stanza and perhaps prejudices me against it." Values, in fact, were expressed in terms of metre; rhythm; rhyme; simplicity; economy; vowel music; choice of words; nature of associations; artificiality, among others. And some judges are of opinion that this multiplicity of elements invalidates judgment, a view with which the experimenter found herself in some sympathy. For when one considers the infinite variety and subtlety of rhythm and stress, of vowel music and rhyme pattern; and when, further, one remembers the emotions aroused, the images suggested, and what Mr. I. A. Richards has described as the "network of interpretation and conjecture,"* one feels how these with their ramifications and reverberations in the reader's dispositions and emotional "sets" would seem to render every such experience unique so that it resists comparison with every other. And, indeed, experience seems to bear this out: the emotional condition aroused, let us say, by Wordsworth's "Solitary Reaper" seems to be so peculiarly itself as to be hardly comparable with that given by any other poem. It is not a mere more or less, more pleasurable, more moving; it seems rather to be different in kind, in emotional quality. More than this, some judges seem to indicate a conflict of values, particularly where the intuitive, direct and personal judgment may be out of accord with the

*I. A. Richards: *Principles of Literary Criticism*, p. 129.

more intellectual process of evaluating the lines in accordance with certain principles of criticism. "I felt that these stanzas ought to have been placed higher, but I reacted subjectively against them;" this suggests an intuitive dislike influencing the critical judgment, and there were others who expressed even more unmistakably this dualism between an emotional, intuitive, impressionistic judgment and one founded upon basic principles. A dualism of quite other sort brings us up against the classic question of form versus content, for it seems possible to be in sympathy with the idea while deploring the inadequacy of the form it takes or, on the other hand, to dislike the content while admitting the aptness of its expression. "The theme seemed trivial, while the mode of expression was good of its kind," one wrote. Finally, the possibility under any circumstances of comparing and ranking æsthetic experiences is called in question, and an attack is made upon the fundamental assumption implied in any attempt to establish tests. "It is difficult," remarks one correspondent, "to rank genuine æsthetic impressions in order of merit;" while another asks: "In looking for a consensus of opinion are you not postulating an absolute standard of poetical excellence? How would we judge, for instance, between the 'Ancient Mariner' and 'Paradise Lost,' or between the last scene of 'Lear' and of Marlowe's 'Faustus'?"

In answer to this the most drastic of the lines of criticism, it may be said that we *do*, as a matter of practice, assess and compare our æsthetic experiences, expressing preferences. We have our favourite poems, pictures, musical compositions. Most of us would not regard it as a formidable, much less an impossible, task if asked: "Which of these poems do you prefer?" There appear also to be certain general standards of value, based, presumably, upon a consensus of sensitive and cultivated opinion. By such a standard one pronounces Shelley's "Invocation to the Spirit of Delight", to be a lyric of greater value than those of Mrs. Wilcox.* One may, indeed, agree that the two poems mentioned, the "Ancient Mariner" and "Paradise Lost," are incommensurables, but the field from which stanzas were taken for the tests was deliberately restricted. Descriptive passages were chosen, generally of some aspect of nature, and the more salient differences of subject and treatment were carefully avoided. Within these limits the experimenter is of opinion that sets of stanzas can be found which may be ranged in a hierarchy of poetic merit.

*After writing this the following was met with: "Keats, by universal qualified opinion, is a more efficient poet than Wilcox." Richards: *Principles of Literary Criticism*, p. 206.

It is impossible to discuss so intricate a problem adequately in a short paper, but one other difficulty must be briefly considered. It was said that judgment is rendered uncertain by the variability of our mood or attitude towards works of art. But this, in the experimenter's experience, is not so much a change from moment to moment as a gradual process, corresponding to the general change of outlook brought about by the passing years. So the poem which delights the adolescent may appear crude or sentimental to the fully adult mind. But this change is itself a sign of maturer judgment and, therefore, entirely relevant to the purpose of the tests. As for "passing" moods, it appears to introspection that these are largely abandoned at the moment of making the judgment. Whatever may happen when one voluntarily sits down to read a poem, under the conditions of the experiment, when one is set before the material with the definite instruction: "Arrange these stanzas in order of preference," the influence of any preceding mood is, if not entirely destroyed, at least greatly reduced. The "determining tendency" set up by the instructions would seem to produce a relatively dispassionate and unprejudiced attitude of mind. How far this critical, reasonable attitude is foreign to the æsthetic experience is a further question—the experimenter was convinced that, however carefully one may try to avoid the examination atmosphere and the suggestion that the subject's power of judging is itself before the bar, test conditions are inimical to the full æsthetic experience. The testee is not so much sitting down to enjoy, as with the worrying question: "Which of these am I enjoying," or even, unfortunately, "Which of these *ought* I to enjoy, which am I *expected* to like best?" Recalling certain principles of criticism, she is, perhaps, searching diligently to discover whether the stanza does or does not conform to these canons. But the moment which can truly be described as æsthetic is a moment of contemplation and receptivity rather than one of critical analysis. It holds the "thrill" of immediate response to the artist's mood, and although it is true that our capacity for feeling this ecstasy may have a foundation in years of analysis and comparison, yet these processes are implicit rather than part of the conscious experience of the moment. Force them into the light and the moment is destroyed.

IV.—RESULTS.

Before considering the results of the testing, certain factors which may have influenced the two courses of training must be mentioned. The first of these is overlapping, some degree of which was unavoidable.

Although the control course could be steered clear of all creative work, the exercises in the experimental course involved discussion, as of the various types of metre and stanza-forms, and some reading by the experimenter of verse to serve as models of these forms. To this extent, the methods encroached upon those of the "control" course. A second factor was the attitude of the experimenter to the work. Although she endeavoured to be as neutral as possible she found herself feeling a natural curiosity with regard to the experimental course and a particular interest in its fortunes. The preparation of this course, itself tentative and experimental, necessitated more thought and expenditure of time. Against this, however, may perhaps be offset the fact that familiarity with the alternative method caused this to be carried out with greater ease and assurance. A third factor was the attitude of the subjects. In spite of efforts to keep each group in ignorance of the procedure adopted by the other, leakages were bound to occur in the course of a year's work, with the result that the control group came to feel that they were missing something—they were heard to refer to themselves as the "dull" group and this, possibly, had some effect upon their morale!

As the verse-making course proceeded the very wide range of ability shown by the subjects, though not altogether unexpected, was yet remarkable. From the student to whom the numbers came readily and without effort, who imitated any type of stanza with fluency, whose language had some beauty and whose imagery was vivid and illuminating, to the one at the other end of the scale whose painful and prolonged travail brought forth only a puny, deformed and limping couplet, all degrees of facility for poetic expression were discovered. The work, as has been shown, was progressive in difficulty and it was towards the end of the course that variations in ability were most apparent—by the time sonnet-making was reached many were out of their depth. It was naturally anticipated that this factor would be an important one in determining how far the exercises would influence the students' judgment, and this was amply borne out by the results of the tests. These were given in three series, before the training began, halfway through the course, and again at the end, and the results of these three testings were compared. Conditions for testing were as satisfactory as possible; no strict time-limit was given, the slowest student having ample time to record her judgments at leisure. It was felt that any idea of working against time would tend to vitiate the experiment. After recording their choice the students were asked to give reasons for their judgments where possible, and these records were made use of in considering individuals, although, of course, incapable of quantitative assessment.

For the same purpose, a Shakespeare sonnet was put before the students and they were required to select six lines or phrases of particular beauty; and the poem of A. E. Housman beginning "From far, from eve and morning," was read twice to them, after which they recorded their impressions. Such records were found to be of great value in the qualitative consideration of results. The training began in January, the second testing took place in May, and the third in the February of the following year. With no precedent to follow, the tests were scored on arbitrary lines, but precise numerical scores of an unambiguous nature were possible. In the second testing it was found that the average score for both groups had increased, the control group scoring an average increase of eight marks (on a total of eighty-five), the experimental group an increase of eleven marks. The advantage was to the experimental group but by an average difference of three marks only. A calculation of the probable error of the difference of these two averages proved it to be entirely insignificant, being no higher than pure chance could account for.

Difference of the means = 3.

P.E. of the difference of the means = 1.93.

In the final testing, six months later, even this apparent slight advantage had disappeared, for now the two groups were found to score an average increase of 8.7 and 8.5 marks respectively on the original tests—a very surprising correspondence between the two groups.

The experimenter, however, had become more and more convinced as the experiment unrolled itself that in such an investigation as this the careful consideration of the performance of individuals and the characteristic quality of their response are of greater value than massed results expressed by some quantitative measure. She therefore proceeded to a closer scrutiny of the individual performances from which these average scores were obtained, being unwilling to accept these results as complete proof that a creative course of verse-making influences the power of judging poetic merit no more, if no less, than the usual methods of study. Even a preliminary survey of the records brought conviction that such a conclusion would be over-hasty. One possible explanation of the general negative result was first considered. As neither group had made any substantial advance on the tests, it would appear that appreciation is not increased, by whatever method of training. Accepting this conclusion as valid for the moment, it would be readily explainable if the Spearman General Factor in intelligence, which is accepted as an original endowment unaffected by training, should be found to bear a close relation to æsthetic appreciation, or, put otherwise,

if the factor "g" was very heavily weighted relative to the factor "s" in this particular ability. Accordingly, tests for "general intelligence" were given to both groups, the Otis Scale and the Terman Group Tests being used on two different occasions. The results for these two tests were compared and a coefficient of correlation was found—($r = .72 \pm .041$). The tests were thus assumed to have a very fair reliability, and the scores for the two tests were summed. The students were then ranked for these total scores, and these ranks compared with those for the Appreciation Tests, Series III :

Comparison of Otis and Terman Tests with

Test of Appreciation $r = .35 \pm .089$.

Such a result, though showing that appreciation is to some slight extent dependent upon the general factor in intelligence, does not afford an explanation of the apparent ineducability of the former. It was found, indeed, on examination, that many of the subjects who held the highest rank in the stanza ratings scored badly for the "general" tests. Further analysis, however, showed that, although in these cases the average for the general tests was low, the scoring was high for the particular tests among these which were literary in character, such as tests of sentence-meaning, disarranged sentences, and sentence-completion. When the six tests of this character were isolated and scored separately the results showed a high correlation with the stanza tests :

Correlation between Tests of Appreciation

and "General" Tests of a literary

character $= .63 \pm .059$.

On the other hand, it was noticed that those subjects most successful with the more literary type of test had remarkably low scores in such tests as the Arithmetic Test and the Number Series Test in the Terman Scale and in the Geometric Figures Test and the Arithmetic Test in the Otis Scale. The following cases are typical :

Subject I.

High Scores.—Best Answer ; Word Meaning ; Sentence Meaning ; Mixed Sentences (Terman) ; Disarranged Sentences ; Narrative Completion (Otis).

Low Scores.—Arithmetic Test ; Number Series (Terman) ; Arithmetic Test (Otis).

Subject II.

High Scores.—Word Meaning ; Sentence Meaning (Terman) ; Opposites ; Narrative Completion (Otis).

Low Scores.—Arithmetic ; Number Series (Terman) ; Arithmetic ; Similarities ; Geometrical Figures (Otis).

Subject III.

High Scores.—Best Answer ; Word Meaning ; Sentence Meaning (Terman) ; Disarranged Sentences (Otis).

Low Scores.—Logical Selection ; Arithmetic ; Number Series (Terman) ; Arithmetic ; Geometrical Figures (Otis).

The tests, therefore, in which the lowest scores were obtained by these subjects can be roughly classified as mathematical ; but they were considered to be neither sufficiently numerous nor sufficiently homogeneous in nature to justify their isolation for purposes of calculating the correlation between poetic judgment and mathematical ability. It can, however, be stated that performance in the tests mentioned showed little relation to appreciation of verse.

These results appear to suggest the presence of a specific factor in poetic appreciation over and above the presence of "g." This factor is closely related to literary ability, as shown by the correlation coefficient just quoted as also by the closely similar co-efficient obtained in correlating the first set of stanza tests with the general tests of a literary nature given at the outset of the experiment for the division of the subjects into parallel groups ($r = .55 \pm .066$). Whether these results can be taken to indicate the presence of a "group" factor of a literary character could only be established by proving the existence of a significant tetrad difference higher than zero when two such "literary" abilities are correlated with two different measures of "g," and that was considered to be beyond the scope of the present enquiry. From the evidence here collected in an experiment with fifty-six subjects, only the following tentative conclusions can be drawn :

(a) That "g" is demonstrably present in the ability to judge poetry but is not dominant here.

(b) That this ability shows a high positive correlation with other forms of literary ability.

(c) The almost negligible average improvement in the ability to judge poetry made during a course of training extending over twelve months suggests that this specific ability is, like "g," a constant factor unaffected by education.

This last conclusion, however, seemed to demand further examination. On the evidence of an average result, are we to assume that this specialized gift of appreciation is, in very truth, a gift of nature, an innate endowment varying in strength from individual to individual but, for any one individual, maintaining a constant strength unaffected by education ? Are we, in this respect, ineducable ? Cannot appreciation be increased by experience and culture ? Much of the work done in schools is, of course, only justified by an assumption that this last question

can be answered in the affirmative and this is the assumption made by most writers in æsthetics. Thus Bosanquet states: "There is nothing in which education is more necessary or tells more."* Experience and common-sense pointing in the same direction, the experimenter was led to question her averages, which, in some cases, may merely serve to obscure the issues. "An average," says Myers, "is often a blurred result the chief value of which is to draw attention to the individual variations."† Accordingly, individual records were further scrutinized, and a list of those subjects whose scores showed that they had made the most substantial progress in their power of judging verse was collected. There were found to be fourteen of these, and whereas for the entire group the average increase was eight marks for these fourteen subjects it was as high as eighteen. (The actual scores for these fourteen subjects in the three sets of tests are given in Appendix II.) The distribution of these fourteen individuals among the experimental and control groups respectively was immediately interesting; ten of them belonged to the former while four only belonged to the control group. Of the twenty-seven subjects who had done the creative work, ten, or 37 per cent, had shown a significant improvement in the tests of appreciation, and this is a by no means negligible proportion. The four subjects who, although not in the experimental group, yet appeared to make a considerable advance in æsthetic judgment need some discussion. It has been remarked that they form a small proportion of the whole group and, even so, the experimenter was not satisfied that their apparent improvement was genuine in every case. It will be noticed, for example, that two of these, numbers thirteen and fourteen in the table (Appendix II), although their scores were greatly increased in the second testing, yet failed to maintain that advance in the third testing. This suggests unreliability in their scores and is one of the factors which produces doubt of the infallibility of the tests used. Further, there was nothing in the usual performances of an allied nature to justify the relatively high score of Subject XIII in the second testing, and it will be noticed that Subject XIV shows an increase of nine marks only upon her first score, the minimum increase for this selected group, and only one mark above the average increase for the entire group, which was taken as the arbitrary basis of selection. In the case of Subject XI, the experimenter felt that the improvement of her score was not indicative of true advance in judgment, for her very low score in the first series of tests occasioned so much surprise at the time that the experimenter, who had formed

*Bosanquet: *Three Lectures on Æsthetics* (Macmillan, 1923), p. 5.

†Myers: *Text-book of Experimental Psychology*, 1911, p. 117.

a high opinion of this subject's taste and judgment, was at pains to investigate further by discussion with the student, and this only confirmed her original opinion. This opinion was further corroborated by the results of exercises given to all the subjects involving a written appreciation of poems read aloud to them, the selection of preferred lines in a Shakespeare sonnet, and so on, as described on page 53. In these exercises this particular subject showed a delicacy of response and a sureness of judgment surpassed by few. Such exercises were given to enrich the experimenter's knowledge of the subject's æsthetic experiences and to serve as some indication of the absolute validity of the Stanza tests themselves, although by their nature they resisted all numerical scoring and arraying of the students in rank according to merit. The experimenter is fully aware that conviction forced upon herself by such exercises and individual interviews can hardly be conveyed to a reader, but she was persuaded that this initial low score was anomalous. The later scores seem to measure not so much the subject's growth as her true and normal level. Of the last of these four subjects, Number VIII in the table, no such account can be given. She maintained her advance in the final testing and it appeared to the experimenter to be thoroughly genuine.

The further question whether there is anything which distinguishes those students who profited by the course from the remaining seventeen who did not again led to a useful suggestion. For eight of these ten form the bulk of a small group, again of ten subjects, who had been noted throughout the course as possessing a natural facility, if not for making poetry, at least for rhythmic expression. Their creative work was on a much higher level than that of the average for the group and they generally tackled the exercises with assurance and enjoyment. There remain, indeed, two others who advanced in judgment without distinguishing themselves in verse-making, namely Numbers XI and XII in the table. They are students of similar type, both classed as "musical" in a classification of the subjects into types, with an ear for rhyme and rhythm although they lacked the liveliness of imagination shown by better endowed students. They took great interest in the course and certainly made better verses than might have been anticipated from the level of their general intelligence. (They ranked 46th and 47th respectively in the general tests and no student below that level produced any verse at all.) Their verses indeed had a technical correctness and even some beauty of melody at times, though they were poor and commonplace in conception and did not therefore justify the inclusion of these subjects in the select group of really successful verse-makers.

Some account must be given of the students at the other end of the scale whose low scores in the final testing partially cancelled-out the advance of those just described. There were four marked cases in the Experimental Group (see table—Appendix III). One of these (Number III) was easily accounted for by personal experience of an emotional character which affected all her work during the latter half of her training period and culminated about the time of the final test. A second (Number I) was one of those erratic subjects whose initial high score (she scored the highest marks on the first testing) led, as in the case previously described, though for a precisely contrary reason, to discussion and interview which left the experimenter far from satisfied that this score was truly representative of her æsthetic powers. The remaining two subjects were frankly bewildered by the work throughout. Though they strove conscientiously with recalcitrant stresses and searched for elusive rhymes they achieved so little that the course was for them, at best, a waste of time. It was worse than this, for their ever-growing bad conscience in the matter seemed more and more to confuse their judgment. No student in the Control Group reduced her score so markedly as Subjects III, IV, and I in the Experimental Group, one of the factors which obscured the considerable advance shown by so many of this latter group.

V.—CONCLUSIONS AND TENTATIVE EDUCATIONAL COROLLARIES.

The more individual cases were studied, the less corroboration was found for the negative results suggested by the *average* scores. A careful scrutiny rather suggests that improvement in poetic judgment may be found even after so short a course of training as the one given. Individual variations, however, are very marked, from the student whose score increases by 40 per cent to the one who shows an actual decrease in score. Improvement seems to be favoured by a course in verse-making, for no fewer than 37 per cent of those taking this course showed a marked advance which was apparently genuine; while of the students taking the customary course of reading and discussion only one showed an equally big advance that could be considered genuine. It seems, also, that the type of student who is capable of advance can be defined. It is the one who has a natural facility for verse-composition, who takes readily to the exercises and who performs them with enjoyment. In such students a growth of confidence and increased sureness of judgment were very apparent. In certain of them, indeed, there were some signs of a "carry-over" into other branches of their college life of the power gained in this course. They showed an all-round increase

in self-confidence which resulted in a better output of work. It was as though energies formerly held in check by diffidence or some other inhibitory factor were now released through the creative activity and could flow out, not alone through the channel of verse-making, but also along other lines of independent creative endeavour.

Educational corollaries drawn from such results can be only of a very tentative nature and must be given in summary fashion. It appears that the commonly accepted opinion that taste can be cultivated may not be universally true. Certain subjects of the experiment seemed quite impervious to æsthetic training whatever method was adopted, and every teacher could name a minority of pupils upon whom the study of poetry seems to be wasted. It is a question whether it would not be better to exclude them from these classes, giving them the opportunity to develop instead some ability which they do possess. Further, verse-making as a method of training in appreciation should be used with discrimination. In any group, possibly not more than 50 per cent, namely those who have some natural gift for this form of expression, will profit by such exercises; and the teacher would do well to discover these by a short preliminary course. It is a commonplace of educational theory that methods of teaching should be adapted to individual requirements, and nowhere are individuals more sharply differentiated than in their possibilities of response to æsthetic impressions. To some few poetry makes no sort of appeal and, in spite of the labours of the school throughout the most plastic years of their life, they will never seek pleasure in reading verse. Others may enjoy reading or hearing, but will never themselves construct one satisfactory line. But there are yet others who have a turn for rhythmic expression, and while few of these will ever be acknowledged as poets, all may gain by this means further understanding of the poet's craft and an added power of feeling behind his lines to the mood that inspired them. To these the teacher may do a twofold service; they may be enabled to enter, through sympathy, into the ecstasy of the poet's vision and they may have the still greater satisfaction of creative expression through a medium for which Shelley claims the highest place among the vehicles of artistic expression, and which, demanding neither tools nor instruments, is more readily accessible than that of any other of the arts.

APPENDIX I.

SAMPLES OF TESTS USED TO MEASURE THE POWER OF APPRECIATING POETRY.

TYPE A.

Read each version carefully and try to think how it would sound if read aloud.

Which version is the poorest poetry, which is the best poetry?
 Arrange them in order according to your preference, e.g.:

Best : Version Y.

Middle : Version Z.

Poorest : Version X.

VERSION X.

These fields are desolate—no Springtide sowing,
 No busy reaping, mirthful harvest-morn
 Comes to them now ; no sound of cattle lowing
 Or cheerful human voice—only, forlorn,
 A lost bird's cry. Yet here, by great trees shaded,
 The square grey house stood bravely long ago,
 And the rich waves of golden corn invaded
 The hills above, the lovely vale below.

VERSION Y.

Once, long ago, an old house stood just here,
 And cornfields golden at turning of the year ;
 But now the fields are very sad and grey
 And no one cares for them this many a day.

VERSION Z.

Here where the fields lie lonely and untended,
 Once stood the old house grey among the trees,
 Once to the hills rolled the waves of the cornland,
 Long waves and golden, softer than the seas.

(Arranged by the Experimenter.)

TYPE B.

Say which of the four versions you prefer.

VERSION A.

"Let there be light," said God, and forthwith Light
 Ethereal, quintessence pure, first of things,
 Came from the ocean deep, and from the East
 Began to travel through the gloomy air,
 Hid in a glowing cloud ; until the Sun
 Should be created, in the cloud she had
 To stay. God saw the light, that it was good.

VERSION B.

"Let there be Light," said God, and forthwith Light
 Ethereal, first of things, quintessence pure,
 Sprung from the Deep, and from her native East
 To journey through the airy gloom began,
 Spher'd in a radiant cloud, for yet the Sun
 Was not ; she in a cloudy tabernacle
 Sojourn'd the while. God saw the Light was good.

VERSION C.

And God said, " Let Light be," and there was Light.
 The first ethereal created thing
 To being sprung, and daily from the East
 Began to travel through the darksome air ;
 Until the golden sun should be created
 She sojourn'd in a radiant, shining cloud.
 God looked upon the Light and it was good.

VERSION D.

" Let there be Light," said God, and lo ! the Light
 Sprung from Tithonus' bed in darksome gloom,
 Deck'd her fair form in garments rich and rare
 And scattered smiles along the mournful sky.
 Her chariot of the Sun not yet created,
 Upon a cloud the nymph ethereal rode.
 And when the cloud wept raindrops, down she flung
 Comforting rainbows from her shining tent.

From " Abbot and Trabue " : Exercises in Judging Poetry.

TYPE C.

Arrange the stanzas in order of preference.

STANZA A.

Above yon sombre swell of land
 Thou see'st the dawn's grave orange hue,
 With one pale streak like yellow sand,
 And over that a vein of blue.
 The air is cold above the woods
 All silent is the earth and sky,
 Except with his own lonely moods
 The blackbird holds a colloquy.

STANZA B.

Divinely thrilled was the man, exultingly full,
 As quick well-waters that come of the heart of earth
 Ere yet they dart in a brook, are one bubble-pool
 To light and sound, wedding both at the leap of birth.
 The soul of light vivid shone, a stream within stream ;
 The soul of sound from a musical shell outflow ;
 Where others hear but a hum and see but a beam
 The tongue and eye of the fountain of life he knew.

STANZA C.

The calm waves are smiling
 As urging, beguiling,
 To where the blue heavens they meet ;
 And the soft zephyrs blowing
 Where are sweet flowerets growing,
 Fill the air with their perfumes so sweet.

STANZA D.

So some tempestuous morn in early June,
 When the year's primal burst of bloom is o'er,
 Before the roses and the longest day—
 When garden-walks and all the grassy floor
 With blossoms red and white of fallen May,
 And chestnut flowers are strewn—
 So have I heard the cuckoo's parting cry,
 From the wet fields, through the vext garden trees,
 Come with the volleying rain and tossing breeze,
 "The bloom is gone, and with the bloom go I!"

STANZA E.

Let the weary world go round
 What care I?
 Life's a surfeiting of sound
 I would die.
 Happy would it be to lie
 Under waving grasses,
 Where a maiden's footstep shy
 Timorous for a lover nigh
 Sometimes passes.

(Arranged by the Experimenter.)

APPENDIX II.

SCORES FOR FIFTEEN SUBJECTS MAKING A CONSIDERABLE ADVANCE IN
 THE TESTS OF APPRECIATION.

Subject.	Rank.			Marks.		
	1st Test.	2nd Test.	3rd Test.	1st Test.	2nd Test.	3rd Test.
* I ..	8	1.5	3	55	75	67
* II ..	8	1.5	1	55	75	72
* III ..	20	15.5	5	46	61	66
* IV ..	23	7	10	44	66	63
* V ..	27	6	17.5	42	68	58
* VI ..	29	11	14.5	42	63	59
* VII ..	31	14.5	11	41	61	61
VIII ..	38	8.5	12.5	39	65	60
* IX ..	41.5	41	14.5	38	46	59
X ..	44	10	9	37	64	64
* XI ..	48.5	20	26.5	33	59	54
* XII ..	48.5	8.5	12.5	33	65	60
XIII ..	51.5	23	45	30	58	45
XIV ..	18	4	20.5	48	73	57

APPENDIX III.

SCORES FOR EIGHT SUBJECTS WHOSE JUDGMENT SEEMED TO SHOW MARKED
DETERIORATION.

<i>Subject.</i>	<i>Rank.</i>			<i>Marks.</i>		
	<i>1st Test.</i>	<i>2nd Test.</i>	<i>3rd Test.</i>	<i>1st Test.</i>	<i>2nd Test.</i>	<i>3rd Test.</i>
* I ..	1	20	17.5	65	59	58
II ..	3	14.5	24	60	61	55
* III ..	4	5	43.5	59	69	45
* IV ..	10.5	31	41	54	54	46
* V ..	12.5	39	26.5	53	46	54
VI ..	17	25.5	44	49	57	45
VII ..	19	52.5	41	47	32	46
VIII ..	23	37	46	44	50	43

*Members of the Experimental Group.

RÉSUMÉ.

L'INFLUENCE DU TRAVAIL CRÉATEUR SUR LE JUGEMENT
ESTHÉTIQUE. EXPÉRIENCE DANS L'ENSEIGNEMENT DE LA POÉSIE.

On tenta de découvrir jusqu'à quel point le jugement de la poésie est influencé pas une suite de leçons dans la composition poétique. Deux groupes parallèles d'étudiants reçurent de l'instruction pendant une année, le groupe expérimental au moyen d'exercices dans la composition poétique, le groupe de contrôle au moyen de la lecture et de la discussion de poèmes. On éprouva avant et après cette instruction, le pouvoir de juger la poésie, au moyen de tests comprenant la comparaison et l'arrangement de strophes d'une valeur diverse. Les conclusions suivantes sortirent de l'investigation.

- (1) Des tests de jugement sont difficiles à inventer et ne sont pas entièrement satisfaisants.
- (2) Le facteur "g" ne semble pas peser beaucoup relativement au facteur "S" dans le jugement des poèmes.
- (3) Il existe un haut degré de corrélation entre le jugement esthétique et les autres formes de capacité littéraire.
- (4) Un progrès dans le pouvoir de juger se montra chez une proportion beaucoup plus grande des sujets dans le Groupe Expérimental que dans le Groupe de Contrôle, bien qu'il n'y eût aucune différence appréciable dans le progrès moyen des deux groupes.
- (5) Les sujets qui firent le plus de progrès dans le jugement étaient en général ceux qui excellèrent aux exercices de composition poétique.

ÜBERSICHT.DIE WIRKUNG SCHAFFENDER ARBEIT AUF ÄSTHETISCHES URTEIL :
EIN VERSUCH ZUM LEHREN DER POESIE.

Man hat versucht die Wirkung von Übungen in der Dichtkunst auf Schätzung der Poesie zu entdecken. Zwei parallele Gruppen von Studenten wurden während eines Jahres unterrichtet, die Experimentelle Gruppe durch einen Kursus im Dichten, die Kontrollgruppe durch das Lesen und Besprechen der Dichtung. Die Fähigkeit Dichtung zu beurteilen wurde am Anfang und am Ende der Kursus durch Tests geprüft, die das Vergleichen und Ordnen nach Qualität von Strophen verschiedenen Wertes bezweckten. Folgende Schlüsse erfolgten aus den Untersuchungen :

- (1) Es ist schwierig Schätzungstests aufzustellen und sie sind nicht befriedigend.
- (2) Der Faktor "g" scheint keinen besonderen Vorteil zu besitzen im Verhältnis zu "S" in der Schätzung der Poesie.
- (3) Es besteht eine hohe Korrelation zwischen Schätzung und gewissen anderen Formen literarischer Begabung.
- (4) Eine Besserung im Urteil wurde von einer viel grösseren Anzahl von Versuchspersonen in der Experimentellen Gruppe als in der Kontrollgruppe gezeigt obgleich kein beachtenswerter Unterschied in der durchschnittlichen Besserung für die beiden Gruppen erfolgte.

Die Vp., die die grössten Fortschritte in der Schätzung machten, waren hauptsächlich die, die sich in den Dichtübungen auszeichneten.

THE PREDICTIVE VALUE OF INTELLIGENCE TESTS FOR SECONDARY EDUCATION.

BY J. W. COLLIER.

- I.—*Introduction.*
- II.—*The Criterion.*
- III.—*The Admission Examination.*
- IV.—*Correlations.*
- V.—*Partial Correlations.*
- VI.—*The Influence of Selection.*
- VII.—*Conclusions.*

I.—INTRODUCTION.

THIS article deals with the same subject, in much the same way, as that by Mr. Donald Amos in this Journal, 1931, Vol. 1, No. 1, p. 73. It is not necessary, therefore, to repeat his statement of the problem.

The selection of pupils for secondary education is important both to the individual and to the State, and in the County of Northumberland a systematic attempt is being made to ascertain how the admission examination works.

The preparation of the materials for the present investigation was begun more than five years ago, when after some years of experiment it began to be apparent that an Intelligence Test would become a recognized part of the Northumberland Admission Examination. At that time an Intelligence Test did form part of the examination, but was not used except to decide doubtful cases. The results of the 1926 admission examination were worked out and preserved in a way that made subsequent comparisons easy, and a system of record keeping was begun with the same end in view. The progress of every pupil then admitted to a secondary school has been recorded, and each year an estimate of his standing has been made, upon which routine administration has been based.

II.—THE CRITERION.

At the end of five years, Head Masters and Head Mistresses each made a special assessment of the 1926 pupils' suitability for the secondary school course, on a scale ranging from A1 to E3, as follows:—

A1, A2, A3 .. For pupils of outstanding excellence, fitted for the highest forms of education.

B1, B2, B3 .. For pupils distinctly better than the majority of secondary school pupils.

C1, C2, C3 .. For ordinarily satisfactory pupils, comprising, in the absence of special circumstances, nearly half the group under review.

D1, D2, D3 .. For weak pupils.

E1, E2, E3 .. For definitely unsatisfactory pupils.

The assessment, it was understood, was not to be based entirely on academic attainments, but was to take into account character and qualities which are not measured by examinations but which may help pupils to take advantage of the education provided in a secondary school.

An inspection of the marks allotted throughout each school revealed, as was to be expected, some differences of standard, and to lessen the influence of these differences, the schools have been divided into three groups, in each of which the standards of assessment are reasonably uniform. Group 1 comprises 75 pupils from six schools; Group 2 81 pupils from five schools; Group 3, 70 pupils from three schools. In addition, there has been formed from seven schools a composite group (Group 4) of 117 pupils, whose marks in four main subjects in the Durham (1931) School Certificate Examination corresponded closely with the school assessments given. Each pupil had completed at least three years' attendance (most of them five) and all were over eleven and under twelve years of age at entry on 1st August, 1926.

III.—THE ADMISSION EXAMINATION.

The admission examination consisted of an Arithmetic paper, an English paper, and an Intelligence Test (Moray House Test 3) prepared by Professor Godfrey Thomson. For the present purpose the marks originally scored have been adjusted for differences in the age of the pupils, and converted into "scale values," so arranged that equal weight is given to the three tests in the combined total.

IV.—CORRELATIONS.

The correlation co-efficients obtained by comparing the secondary school assessments (S), with the admission examination Arithmetic scores (A), English scores (E), Intelligence Test scores (I), and total (T) are shown in the table below :

Correlation between Secondary School Assessment and	Group 1.	Values of r.		
		Group 2.	Group 3.	Group 4.
A = Arithmetic.....	.33	.20	.24	.25
E = English .....	.30	.36	.18	.42
I = Intelligence Test.....	.47	.47	.51	.48
T = Total* .....	.50	.51	.42	.53

Of the three constituent parts of the examination, the Intelligence Test comes out best. But, in three of the four groups, the result for T (the combined total of A, E, and I) is better, which indicates that the Arithmetic and English tests had a value of their own.

V.—PARTIAL CORRELATIONS.

What is the value of the three parts of the examination separately? A, E, and I all measure certain abilities, and the correlation co-efficients of the three pairs AE, AI, EI,† indicate that while no two of the tests measured the same abilities to the same extent yet each pair did measure something in common.

Each of the three tests A, E, and I measured something in common with the other two, varying in amount as indicated by the correlation coefficients, and the real value of each, peculiar to itself, is only determined when the factors it shares with the others are eliminated. For this purpose the formulæ for "partial correlations" are used.‡

*The correlations between Secondary School Assessments and the total of Arithmetic marks and English marks are :

Group 1	2	3	4
.41	.37	.27	.44

Reference should be made to Professor Valentine's recently published book : *The Reliability of Examinations: an Enquiry* (University of London Press, 1932). See especially the correlation results for his Centre J (pages 68 to 73, 179 to 181), which are about 0.40, rising to 0.46 after the introduction of mental tests and other changes.

†Quoted in Section VI.

‡*Essentials of Mental Measurement*, Brown and Thomson, page 144.

The result is as follows :

Correlation between School Assessment and	Observed Correlation Coefficients as above.				Partial Correlations (Other two eliminated).			
	Group 1.	Group 2.	Group 3.	Group 4.	Group 1.	Group 2.	Group 3.	Group 4.
Arithmetic .....	.33	.20	.24	.25	.18	.10	.05	.01
English .....	.30	.36	.18	.42	.15	.30	.09	.87
Intelligence.....	.47	.47	.51	.48	.32	.42	.45	.38

Three years ago a similar investigation was made, under less rigid conditions, on the school career of 346 pupils admitted in 1923. The result then obtained was :

Correlation between School Assessment and	Observed Correlation Coefficients.	Partial.
Arithmetic .....	.34	.12
English.....	.37	.24
Intelligence .....	.45	.35
Combined Total .....	.51	—

VI.—THE INFLUENCE OF SELECTION ON THE CORRELATION COEFFICIENTS.

It may be said that even the highest of these correlation coefficients is low. But it must be remembered that they are concerned with highly selected groups, and selection reduces correlation. (On this readers are referred to "The Essentials of Mental Measurement," chapter VII.)

For the four groups under review, the correlations between the scores in the several parts of the admission examination were :

	Group 1.	Group 2.	Group 3.	Group 4.	Average.
r _{AE}.....	.14	.31	.05	.06	.14
r _{AI}.....	.41	.48	.54	.54	.49
r _{EI}.....	.40	.26	.19	.21	.27

Compare these with the coefficients for all the pupils (over 1,300) who took the admission examination. They are :

$r_{AE.}$	.47
$r_{AI.}$	.60
$r_{EI.}$	.53

VII.—CONCLUSIONS.

As far as this one examination is concerned, it would appear that :

- (1) The Intelligence Test was the most effective part of the examination,
- (2) The Arithmetic Test was the least effective part.
- (3) The best result is obtained by a combination of the Arithmetic, English, and Intelligence marks.

It may be added that the figures obtained justify the process of adjusting marks so as to avoid giving Arithmetic the influence it usually exerts through its wider scatter of marks. They suggest, indeed, that the process ought to be carried farther by a differential weighting in favour of the English and Intelligence marks.

RÉSUMÉ.

LA VALEUR PROPHÉTIQUE DES TESTS D'INTELLIGENCE POUR L'ÉDUCATION SECONDAIRE.

On décrit les moyens adoptés par le comté de Northumberland pour suivre à travers l'école secondaire le progrès des élèves admis en 1926 sur les résultats d'un examen comprenant l'Arithmétique, l'Anglais, et un Test d'Intelligence, et pour comparer leur position scolaire au bout de cinq ans, avec leur accomplissement dans l'examen d'admissibilité. On donne les coefficients de corrélation pour chacune des trois parties de l'examen aussi bien que pour l'ensemble, et, au moyen des "corrélations partielles" on estime la valeur relative des différentes parties. La conclusion la plus importante c'est que l'épreuve en Arithmétique, sauf en ce qui concerne les aptitudes éprouvées par l'épreuve d'Anglais ou le test d'Intelligence, n'avait que très peu de valeur, et que le Test d'Intelligence était la partie la plus efficace de l'examen.

ÜBERSICHT.DIE BEWÄHRUNG DER INTELLIGENZPRÜFUNGEN IM HÖHEREN
ERZIEHUNGSWESEN.

Es werden die Anordnungen geschildert, die in der Grafschaft Northumberland getroffen wurden, um die 1926 auf Grund eines Examens im Rechnen und in englischer Sprache und einer Intelligenzprüfung aufgenommenen Schüler zu beobachten und um ihre Leistungen nach fünf Jahren mit denen in der Aufnahmeprüfung zu vergleichen. Die Korrelationskoeffizienten für jeden der drei Teile der Prüfung und für die Prüfung als Ganzes werden gegeben, und durch "Teilkorrelationen" wird der Wert der verschiedenen Teile der Prüfungen geschätzt. Die hauptsächlichsten Folgerungen sind, dass die Rechenprüfung—abgesehen von dem, was durch den englischen Test oder die Intelligenzprüfung geprüft wurde—von geringem oder keinem Wert war, und dass die Intelligenzprüfung deutlich als der wirksamste Teil der Prüfung erschien.

GROUP FACTORS AMONG ABILITIES INVOLVED IN A SCHOOL CERTIFICATE EXAMINATION.*

BY J. H. WILSON.

PART I.

Introductory Remarks.

I.—*First series of subjects: English, History, Geography, French, Algebra, Arithmetic and Geometry.*

(a) *Data of experiment*; (b) *Analysis of the data, Tetrad differences, "Factor pattern," Goodness of fit*; (c) *Summary of results.*

II.—*Second series of subjects: English, Algebra, Geometry, Botany, Art, French and Needlework.*

(a) *Data of experiment*; (b) *Analysis of the data, Tetrad differences, "Factor pattern," Goodness of fit*; (c) *Summary of results.*

INTRODUCTORY.

THE main purpose of this enquiry was to find the subjects of the school curriculum which are connected by "group factors."

The analysis is made in the case of three sets of subjects. In one and all, the laborious collection of the initial data and the calculation of the intercorrelations of the selected subjects were made by Dr. J. M. Crofts, Secretary to the Joint Board of the Northern Universities. The data are derived from that Board's School Certificate Examination, 1929.

In the investigation of "general ability" or "intelligence" psychologists have observed a tendency among batteries of intelligence tests (as given and as scored) to be "hierarchical" in that they satisfy the relation

$$\frac{r_{ab} \cdot r_{cd} - r_{ad} \cdot r_{bc}}{r_{ad} - r_{cd} - r_{ab} + r_{bc}} = \text{constant} = C \text{ say } (a, b, c, d \dots 1, 2, 3, \dots x)$$

where r_{ab} is the coefficient of correlation between the measures m_a and m_b of any two out of a set of n (>3) mental measurements $m_1, m_2, m_3 \dots m_n$ of the same individual. This relation expresses the fact that the "inter-columnar" correlation tends to be $+1$.

* I express my deep indebtedness to Professor Godfrey Thomson for many very helpful suggestions.

When the value of C is zero, the relation becomes $r_{ab} \cdot r_{cd} - r_{ad} \cdot r_{bc} = 0$ and is termed a "tetrad difference." When this relation is satisfied by the intercorrelations from the intelligence tests, the result has been shown to be compatible with expressing the n correlated variables either in terms of one general "factor" * g and n specific "factors" s , or in terms of numerous dice-like elements, d , distributed according to the laws of probability combined in particular systems of which the details must be supplied.† These explanations are known as Spearman's "Theory of Two Factors" and Thomson's "Sampling Theory of Ability." "Sampling" may refer to dealing with finite numbers of either the many " d 's," the n tests or the N individuals. The essence of Thomson's "Sampling Theory of Ability" is in considering each test as depending upon a sample or proportion of the many " d 's."

In exploring the relative adequacy of these two hypotheses to fit all the observed facts, modifications have had to be made. In the former, when the tetrad equation is not satisfied, the variation is explained in terms of "group factors," by which is meant that the "specific factor" of one variable is the same as that of another. In the latter, modifications have been made as to the number of the " d 's" and as to the probability of their occurrence in any one measurement.

For the purpose of interpretation a synthesis of the two views has been suggested by Dodd,‡ that the d 's are the determining elements of the g and s when these exist.

The statistical technique may be advantageously applied in other fields of investigation and has been done here.

I. FIRST SERIES OF SUBJECTS.

(a) *Data of the Experiment.*

The analysis in this, the first investigation, was made with the subjects English, History, Geography, French, Algebra, Arithmetic and Geometry. There were found 371 candidates who had presented themselves in all these subjects in the examination.

In this examination the papers are given with the minimum of verbal instructions and under conditions which vary little from one centre to

* Professor Godfrey Thomson has pointed out that the term "factor" has a special meaning in mathematics different from that in its present context. He points out that "component" or "element" might perhaps be better. I have put the word in inverted commas to show that it is used here in the sense of a component or additive part.

† J. C. M. Garnett, *Proc. Royal Soc.*, A, XCVI, 1919; C. Spearman, *Proc. Royal Soc.*, A, C.I, 1922.

‡ "On the Sampling Theory of Intelligence": S. C. Dodd. *Brit. Journal of Psych.*, 1929, Vol. XIX, p. 306.

another. The marking of the papers, though undertaken by different examiners for different subjects, was done throughout by one examiner in each subject.

The pupils are not of one age but the age range is small. Further, they are all pupils of secondary schools who have completed the normal course. They may be considered from these points of view, therefore, as being a fairly homogeneous group.

(b) *Analysis of the Results.*

The measured variables $m_1, m_2, m_3 \dots m_n$ (in σ units) are resolved into linear functions of a number of independent "factors" or elements $e_1, e_2, e_3 \dots e_p$. The coefficient of any "factor" e_x of the variable m_1 is written k_{1x} and the "factor pattern" * (as it has been called), in its most general form may be written :

$$m_1 = k_{11}e_1 + k_{12}e_2 + \dots + k_{1p}e_p$$

$$m_2 = k_{21}e_1 + k_{22}e_2 + \dots + k_{2p}e_p$$

$$\dots \dots \dots$$

$$m_n = k_{n1}e_1 + k_{n2}e_2 + \dots + k_{np}e_p$$

This may be more briefly written :

	e_1	e_2	e_3	e_p
m_1	k_{11}	k_{12}	k_{13}	k_{1p}
m_2	k_{21}	k_{22}	k_{23}	k_{2p}
.
m_n	k_{n1}	k_{n2}	k_{n3}	k_{np}

The problem is to find the appropriate values of these coefficients. The coefficient k_{xp} expresses the correlation between the variable m_x and the "factor" e_p attached to it.

(1) *Approximate Method.*—In Table I are to be found the inter-correlations of the seven school subjects under consideration.

TABLE I.
INTERCORRELATIONS.

Subject.	Engl.	Hist.	Geog.	French.	Alg.	Arith.
(1) English	—	—	—	—	—	—
(2) History .....	.667	—	—	—	—	—
(3) Geography .....	.515	.564	—	—	—	—
(4) French .....	.529	.411	.381	—	—	—
(5) Algebra .....	.326	.327	.469	.403	—	—
(6) Arithmetic .....	.300	.364	.439	.369	.679	—
(7) Geometry .....	.368	.351	.465	.348	.725	.592

* *Vide* "Uniqueness of Factor Patterns": Holzinger and Swineford. *Journal Educ. Psych.*, Vol. XXIII, 1932, p. 247.

Were all the coefficients found in this table exclusively due to a common "factor" "g" and a number of "specific factors" s_a, s_b , etc., the evaluation of r_{ag}, r_{bg} , etc. (termed "coefficients of saturation") might readily be effected by the procedure given by Spearman (*vide The Abilities of Man*, Appendix, p. xvi, especially equation 21). In the case under consideration there is no certainty that such a condition exists. To apply the procedure here must be unreliable and values obtained by it must be considered as approximate and perhaps misleading. Such values will serve, however, to give a rough insight into the presence of "group factors" and serve as a valuable help in directing subsequent analysis, because s_a and s_b being the components "specific" to m_a and m_b it follows that $r_{s_a s_b}$ should equal zero. The extent to which $r_{s_a s_b}$ differs from zero affords evidence that some parts of s_a and s_b are common to m_a and m_b . The value $r_{s_a s_b}$ is the correlation coefficient between a and b after "g" has been removed (termed "specific correlation" by Spearman).^{*} For this reason and this reason only Table II and Table III have been prepared.

TABLE II.
COEFFICIENTS OF SATURATION WITH "g" (TENTATIVE VALUES).

Subject.	r_{ag}
(1) English .....	.659
(2) History .....	.654
(3) Geography .....	.702
(4) French .....	.588
(5) Algebra .....	.724
(6) Arithmetic .....	.671
(7) Geometry .....	.702

In Table III the amounts of "specific correlation" are given.

TABLES III AND IV.
PARTIAL CORRELATIONS ("g" CONSTANT) TERMED "SPECIFIC CORRELATION"
(TENTATIVE VALUES) AND QUOTIENTS.

Subject.	Engl.	Hist.	Geog.	French	Alg.	Arith.	Geom.
(1) English	—	12	2	6	8	7	4
(2) History .....	.414	—	5	1	8	3	5
(3) Geography .....	.097	.195	—	1	2	1	1
(4) French .....	.231	.042	-.050	—	1	1	2
(5) Algebra	-.290	-.281	-.080	-.040	—	8	12
(6) Arithmetic	-.254	-.133	-.060	-.043	.300	—	6
(7) Geometry	-.177	-.200	-.040	-.100	.400	.200	—

^{*} Professor Godfrey Thomson has pointed out to me that the meaning of the word "specific" as used here differs from that when used in connection with the word "factor." In the former case it means "belonging to a species" while in the latter it means "peculiar to one activity only."

To find whether such amounts of correlation are significant they must be compared with their respective probable errors. The expedient here adopted is to divide each of the coefficients by its probable error and to tabulate these quotients as in Table IV. Wherever this quotient attains the magnitude 5 there is evidence of the presence of significant "specific correlation." Table IV is the upper part of Table III.

It is at once evident that in many cases the quotient has at least this value and the presence of "specific correlation" is, therefore, presumed.

(2) *Tetrad Differences*.—The next step in the analysis must deal with the "tetrad differences." With the symbols already allotted a "tetrad difference" is the value of F where

$$F = r_{ab} \cdot r_{cd} \sim r_{ad} \cdot r_{bc}.$$

When the correlation coefficients are exclusively due to the common factor " g ," the value of F is, within the limits of its probable error, zero.

The total number of such tetrad differences is $3 \times {}^nC_4$ which in this case is 105. These 105 tetrad differences have been worked out. Their distribution is shown in Table V; their histogram in Fig. 1 (page 81).

TABLE V.
DISTRIBUTION OF THE TETRAD DIFFERENCES.

<i>Range.</i>	<i>Label in Fig. 1.</i>	<i>Frequency.</i>
·000—·020	0	15*
·020—·060	1	33
·060—·100	2	14
·100—·140	3	15
·140—·180	4	8
·180—·220	5	6
·220—·260	6	6
·260—·300	7	3
·300—·340	8	2
·340—·380	9	3
		105

On the same figure is superposed the theoretical distribution that would ensue were there no "specific correlation." It is at once made evident that correlation abounds over and beyond that due to " g ."

(3) "*Reference Values*."—The evaluation of the amount of "specific correlation" between two variables is effected by means of correlations

* Note that the axis cuts the centre rectangle into two and consequently the frequency for half the whole rectangle is tabulated here.

with other variables, whose own intercorrelations are due exclusively to "g." These latter intercorrelations are spoken of as "reference values."

In order to discover such "reference values" the expedient used is to compare the tetrad differences with their probable errors and, as already stated, the values tabulated in Table IV will afford some guidance as to which tetrad differences among the 105 are most likely to satisfy the criterion.

Examination points to History, Geography, French, and Arithmetic as most likely to afford values complying with the conditions. From four variables it is possible to get three* tetrad differences. In the case of the four subjects mentioned they are :

$$F = .564 \times .369 \sim .411 \times .439 = .0277.$$

$$F = .564 \times .369 \sim .364 \times .381 = .0694.$$

$$F = .411 \times .439 \sim .364 \times .381 = .0417.$$

The mean probable error of all the tetrad differences is given by the formula

$$p.e. = \frac{1.349}{N^{\frac{1}{2}}} \left[r^2(1-r)^2 + (1-R)s^2 \right]^{\frac{1}{2}}.$$

where s is the mean squared deviation of all the r 's from their mean, r the mean of the correlations taken into account and

$$R = 3r \left(\frac{n-4}{n-2} \right) - 2r^2 \left(\frac{n-6}{n-2} \right).$$

Here N = number of pupils and n = number of subjects.

This value was employed in constructing the smooth curve shown in Fig. 1 and is .0266 (*vide* Spearman, *The Abilities of Man*, Macmillan, Appendix, p. xi, also *The British Journal of Psychology*, 1930, Vol. XX, p. 368). Comparing each of the three tetrad differences with this value demonstrates that none of these tetrad differences attains a magnitude of even three times this value and supplies evidence that the abilities examined are uncorrelated except as regards one common "factor."

As, however, these subjects are to be used as key or "reference" subjects to the investigation it has been thought wise to compare each of the tetrad differences with its own probable error. Further, it has been thought best to employ for this purpose the full formula for the probable error and not one of the many approximate forms. The formula chosen is

$$p.e. = \frac{.6745}{\sqrt{N}} \left[r_{ac}^2 + r_{ad}^2 + r_{bc}^2 + r_{bd}^2 - 2 \{ r_{ab} r_{ac} r_{bc} + r_{ab} r_{ad} r_{bd} + r_{ac} r_{ad} r_{cd} \right. \\ \left. + r_{bc} r_{bd} r_{cd} \} + 4 r_{ac} r_{ad} r_{bc} r_{bd} \right]^{\frac{1}{2}}$$

* They are connected by the equation : $F_2 = F_1 - F_3$.

The true value of the probable error does in fact contain terms of a higher order but they add to the values here found amounts that are negligible.

On utilizing the formula there are obtained three values, .0214, .0177 and .0135. As none of the tetrad differences is ever greater than five times its probable error, the conclusion reached is that one underlying common "factor" is sufficient to account for correlation among all these subjects, i.e., History, Geography, French, Arithmetic.

Since the correlation is exclusively due to a single "factor," the method adopted tentatively in the first part of this investigation may now be applied with assurance to these four subjects. It gives a "coefficient of saturation" for each of the subjects History, Geography, French and Arithmetic. These coefficients are .694, .741, .573 and .579. At the same time the amounts of "specific correlation" are found and are shown in Table VI. The quotients show that the figures are not "significant."

TABLE VI.
"SPECIFIC" CORRELATION.

<i>Subject.</i>	<i>History.</i>	<i>Geography.</i>	<i>French.</i>
(1) Geography .....	.103	—	—
(2) French .....	.022	—079	—
(3) Arithmetic	—064	.018	.055

The same expedients were used with Algebra in the place of Arithmetic. Here the three tetrad differences have the values

$$F = .564 \times .403 \sim .411 \times .469 = .0346 \pm .0131$$

$$F = .564 \times .403 \sim .327 \times .381 = .1027 \pm .0281$$

$$F = .411 \times .469 \sim .327 \times .381 = .0680 \pm .0180$$

Similar methods were used with Geometry and gave similar results.

As so far there is no proof that the "common factor" in any one of these three investigations is the same as that in any of the others, the following "factor pattern" is suggested :

<i>Subject.</i>	<i>Ref.</i>	g_1	g_2	g_3	"Specific factor."
(1) History	m_1	.694	.663	.693	k_1
(2) Geography	m_2	.741	.760	.768	k_2
(3) French	m_3	.573	.591	.560	k_3
(4) Algebra	m_4	—	.591	—	k_4
(5) Arithmetic	m_5	.579	—	—	k_5
(6) Geometry	m_6	—	—	.575	k_6

To economize space the coefficients for the specific factors have been grouped in one column separated from the others by a double line.

(4) *Further Criteria.*—There are two further conditions that the coefficients in a "factor pattern" must satisfy. The first is that the sum of the squares of the coefficients in a horizontal row must equal unity. The second is that they must produce the correlation coefficients of the table of intercorrelations from which they have been derived.

Here neither of these conditions is satisfied : a simpler pattern appears to be necessary.

Such a pattern would be forthcoming were the assumption made that the same factor was operative in all three investigations. The adequacy of this assumption will be tested by the extent to which it reproduces the intercorrelations.

With this assumption, values for the "coefficients of saturation" for each subject may be evaluated from the formula (*vide* Spearman, *The Abilities of Man*, Appendix IX, p. xvi).

$$r_{ag}^2 = \frac{r_{ab}r_{ac}}{r_{bc}} = \frac{r_{ab}r_{ad}}{r_{bd}} = \dots = \frac{\sum r_{ab}r_{ac}}{\sum r_{bc}}$$

There still remains the subject English, which from observation of Table IV appears to have specific correlation with several of the other subjects. It is impossible to find three "reference" abilities. From Table IV and such small help as can be eked out of the table of tetrad differences, little, if any, specific correlation is to be expected between this subject and Geography and none between it and any of the mathematical ones. On this basis and the assumption already made it is possible to evaluate r_{ag} for English by means of the same formula.

The values obtained in this way have been tabulated in Table VII. Those for Geography, History and French are averages of those previously given.

TABLE VII.

Subject.	r_{ag}
(1) English	·611
(2) History	·683
(3) Geography	·756
(4) French	·575
(5) Algebra	·591
(6) Arithmetic	·579
(7) Geometry	·575

(5) "*Specific Correlation.*"—Using these values the amounts of "specific correlation" among the various subjects may now be evaluated.

Such values are derived from the formula for partial correlation, i.e.,

$$r_{ab \cdot g} = r_{SaSb} = \frac{r_{ab} - r_{ag} \cdot r_{bg}}{\sqrt{1 - r_{ag}^2} \cdot \sqrt{1 - r_{bg}^2}}.$$

They have been gathered together in Table VIII. In Table IX are the quotients obtained as in Table IV. Table IX is the upper part of Table VIII.

TABLES VIII AND IX.

VALUES OF THE COEFFICIENTS OF "SPECIFIC CORRELATION" AND QUOTIENTS

Subject.	Engl.	Hist.	Geog.	French	Alg.	Arith.	Geom.
(1) English	—	15.4	2.8	8.3	1.4	2.2	0.7
(2) History .....	.431	—	2.7	0.3	2.8	1.7	2.0
(3) Geography .....	.104	.098	—	2.7	1.0	0.5	1.1
(4) French .....	.274	.010	.100	—	2.2	1.5	1.0
(5) Algebra	— .054	— .107	.038	.082	—	19.7	26.4
(6) Arithmetic	— .082	— .064	.018	.055	.512	—	13.4
(7) Geometry .....	.026	— .074	.043	.038	.582	.388	—

It is evident that the intercorrelations are not to be accounted for in terms of "g" and "s" only. There is significant "specific correlation" between English and History; between English and French; and between each pair of the mathematical subjects. In endeavouring to set up a "factor pattern" the simplest assumption to make regarding the mathematical subjects is that they have a common "group factor."

The suggested "factor pattern" is, therefore,

Subject.		g	e ₁	e ₂	e ₃	Specific factor.
(1) English	m ₁	.611	k ₁₁	k ₁₂	—	k ₁
(2) History	m ₂	.686	k ₂₁	—	—	k ₂
(3) Geography	m ₃	.756	—	—	—	k ₃
(4) French	m ₄	.575	—	k ₄₂	—	k ₄
(5) Algebra	m ₅	.591	—	—	k ₅₃	k ₅
(6) Arithmetic	m ₆	.579	—	—	k ₆₃	k ₆
(7) Geometry	m ₇	.575	—	—	k ₇₃	k ₇

Values must now be found for the coefficients such as k₁₁. These values must comply with the conditions already specified. Thus the sum of the squares of the coefficients in a horizontal line must equal unity, e.g., for English (.611)² + k₁₁² + k₁₂² + k₁² = 1, and the correlation coefficients of Table I must be reproduced, as for example for English .611 × .686 — k₁₁ × k₂₁ = .667.

In the case of the mathematical subjects there are thus six equations and six unknown coefficients and the latter are definitely determinable. The coefficient for Geography is also determinable. The case is not the same with the other subjects. Here, further aid is forthcoming by comparing the uneven triplets of "tetrad differences," e.g.,

$$F_{1234} = r_{12} \times r_{34} - r_{13} \times r_{24}$$

$$F_{1423} = r_{14} \times r_{23} - r_{12} \times r_{34}$$

$$F_{1342} = r_{13} \times r_{24} - r_{14} \times r_{23}$$

The outcome of such considerations is the following "factor pattern."

Subject.		g	e_1	e_2	e_3	Specific factor.
(1) English	m_1	.611	.341	.715	—	0
(2) History	m_2	.686	.728	—	—	0
(3) Geography	m_3	.756	—	—	—	.655
(4) French	m_4	.575	—	.249	—	.779
(5) Algebra	m_5	.591	—	—	.708	.387
(6) Arithmetic	m_6	.579	—	—	.476	.644
(7) Geometry	m_7	.575	—	—	.544	.613

(6) *Goodness of Fit.*—The adequacy of the coefficient values is, of course, determined by the extent to which the pattern coefficients reproduce the original coefficients.

In Table IXa are tabulated the intercorrelations calculated from this "factor pattern."

TABLE IXa.
CALCULATED INTERCORRELATIONS.

	1	2	3	4	5	6
(1) English	—	—	—	—	—	—
(2) History .....	.667	—	—	—	—	—
(3) Geography .....	.462	.518	—	—	—	—
(4) French .....	.529	.395	.435	—	—	—
(5) Algebra .....	.361	.404	.447	.340	—	—
(6) Arithmetic .....	.353	.396	.438	.333	.679	—
(7) Geometry .....	.352	.394	.435	.331	.725	.592

In testing the goodness of fit it may easily be seen that the two conditions, namely, that the sum of the squares of the coefficients in a horizontal row shall be unity, and that the intercorrelations (r) of the original table shall be reproduced, are embraced in the one formula

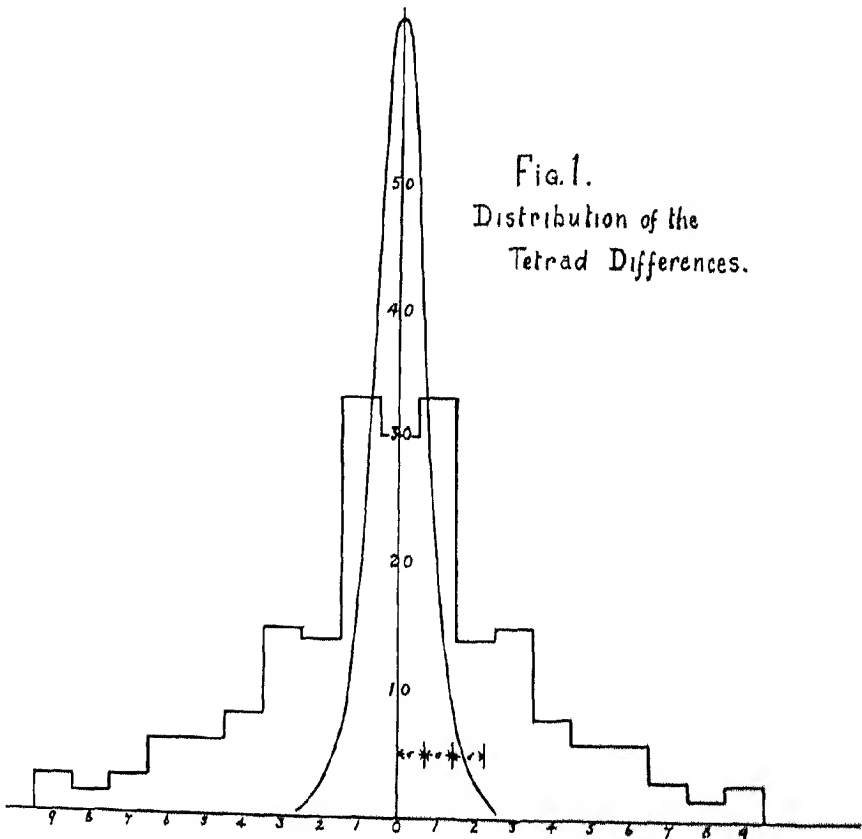
$$2\Sigma r + n = \sum_{x=1}^{x=n} k_{x1}^2 + \sum_{x=1}^{x=n} k_{x2}^2 + \dots + \sum_{x=1}^{x=n} k_{xp}^2$$

On applying this formula there ensues for the left-hand side of the equation the value 26·184 and from the right-hand side 26·164, the difference being ·020.

The sum of the squares of the k 's in each horizontal row is in all cases unity.

The mean of the differences between the actual and calculated correlation coefficients is ·0057 and the standard deviation of these differences is ·0362. There is some doubt as to how to interpret the magnitude of this standard deviation. As, however, the maximum difference in the paired correlation coefficients is but ·077 (a value just over twice the probable error of the coefficient), the fit may be considered good.

The results may, therefore, be explained in terms of these "factors."



(c) *Summary of Results.*

(1) There are five significant coefficients of "specific correlation." Of these, the mathematical subjects account for three. These subjects constitute a group linked by a common factor over and beyond that of "g." Here there is some variance with the results of other workers (*vide* Spearman, loc. cit., p. 232), but it must be remembered that in Algebra and Geometry as often presented in examinations of this kind there is frequently an admixture of much that is purely arithmetical and, in like manner, in the Geometry there is much use of the symbolization of Algebra. The investigations examined by Spearman dealt more particularly with the purer aspects of these three subjects.

(2) Of the remaining two significant coefficients of "specific correlation" one is for English and History, the other for English and French. That there should be a "factor" common to English and French is less curious than that there should be one between English and History and it is a pity that the latter result could not be confirmed with the data available. Such a "group factor" as that here found between English and History is difficult to account for. It is impossible to explain it in terms of a wide language factor, for History has no "group factor" with French, and, for the same reason, "verbalness" or "abstraction" are ruled out. More likely this "group factor" has arisen from the special conditions brought to play in the examination papers, perhaps depending upon some particular training or attainment or interest.

(3) The subject most highly saturated with "g" is Geography. The squared values of the k 's may be interpreted as the portions of variance in the m 's attributable to the various "factors."

II. SECOND SERIES OF SUBJECTS.

The second investigation concerned itself with the series of subjects English, Algebra, Geometry, Botany, Art, Needlework and French.

(a) *Data of the Experiment.*

The data were derived from the same source as in the first experiment. There were, however, only 110 candidates in this case. Such other preliminary remarks as were then made apply equally here.

(b) *Analysis of the Data.*

The intercorrelations of these subjects were calculated and are given in Table X.

TABLE X.
INTERCORRELATIONS.

Subject.	English.	Algebra.	Geometry.	Botany.	Art.	Needlework.
(1) English	—	—	—	—	—	—
(2) Algebra	·245	—	—	—	—	—
(3) Geometry	·293	·611	—	—	—	—
(4) Botany	·433	·296	·323	—	—	—
(5) Art	·149	·295	·285	·193	—	—
(6) Needlework	·254	·121	·157	·225	·338	—
(7) French	·446	·324	·376	·236	·142	—·018

(1) *Approximate Method*.—To this table of figures the approximate method, already described, was applied and the results are given in Tables XI and XII—the approximate amounts of specific correlation in Table XI and the quotients, "correlation coefficient divided by the probable error," in Table XII.

TABLES XI AND XII.
"SPECIFIC CORRELATION" (TENTATIVE VALUES) AND QUOTIENTS.

Subject.	Eng-lish.	Al-gebra.	Geo-metry.	Botany	Art.	Needlework.	French
(1) English	—	2·6	2·6	2·6	2·3	1·5	4·0
(2) Algebra	—·176	—	5·9	0·9	0·7	1·5	1·0
(3) Geometry	—·175	·339	—	1·1	0·1	1·1	1·7
(4) Botany	·166	—·054	—·074	—	0·8	1·0	0·3
(5) Art	—·142	·044	—·010	—·055	—	4·0	1·0
(6) Needlework	·094	—·090	—·074	·071	·239	—	3·0
(7) French	·248	·065	·103	—·016	—·067	—·187	—

(2) *Tetrad Differences*.—Having these findings to serve as a guide, the following groups suggest themselves as possible "reference abilities": the two groups consisting of English, one mathematical subject, Botany and Art; two groups with French in place of English; and four further groups with Needlework in place of Art.

Each of these groups supplies three tetrad differences and, as there are eight groups, there are twenty-four tetrad differences. The values of these tetrad differences and of their probable errors are:

·0032 ± ·0220;	·0804 ± ·0265;	·0836 ± ·0330.
·0660 ± ·0269;	·0091 ± ·0216;	·0751 ± ·0268.
·0030 ± ·0244;	·0200 ± ·0243;	·0230 ± ·0256.
·0021 ± ·0256;	·0161 ± ·0255;	·0140 ± ·0265.
·0076 ± ·0247;	·0200 ± ·0233;	·0276 ± ·0183.
·0060 ± ·0254;	·0270 ± ·0246;	·0210 ± ·0238.
·0440 ± ·0225;	·0780 ± ·0210;	·0340 ± ·0192.
·0480 ± ·0239;	·0810 ± ·0239;	·0330 ± ·0185.

(3) "*Reference Values.*"—It will be seen that the tetrad differences exceed three times their probable errors only in three cases and in no case does it reach the value four times the probable error. In consequence these groups should serve well as "reference subjects."

Using each group in turn there are evaluated four coefficients of saturation for each of English, Algebra, Geometry, Art, Needlework, and French; and eight for Botany.

(4) *Further Criteria.*—So far there is no proof that the same common factor is operative throughout all groups but arguments similar to those previously employed in Section I lead to the rejection of a complicated "factor pattern."

The assumption is made, therefore, that the same factor is operating in all the groups, whereupon the formula already given, p. 78.

$$r_{ag}^2 = \sum \frac{r_{ab} r_{ac}}{r_{bc}}$$

may be applied.

In this way there results the following "saturation coefficients" with the common "factor."

TABLE XIII.
"COEFFICIENTS OF SATURATION" WITH "g."

Subject.	r_{ag}
(1) English .....	.585
(2) Algebra .....	.563
(3) Geometry .....	.629
(4) Botany .....	.606
(5) Art .....	.372
(6) Needlework .....	.257
(7) French .....	.392

(5) "*Specific Correlation.*"—Using these figures the amounts of "specific correlation" are readily computed and are entered in Table XIV.

TABLES XIV AND XV.
"COEFFICIENTS OF SPECIFIC CORRELATION" AND QUOTIENTS.

Subject.	Eng-lish.	Al-gebra.	Geo-metry.	Botany	Art.	Needle-work.	French
(1) English	—	2.0	2.0	2.0	1.5	2.0	5.0
(2) Algebra .....	.127	—	7.4	1.0	1.7	0.5	2.1
(3) Geometry .....	.121	.412	—	1.5	1.1	0.1	2.8
(4) Botany .....	.122	.069	.096	—	0.7	1.4	0.0
(5) Art .....	.091	.112	.071	.043	—	4.6	0.1
(6) Needlework .....	.132	.030	.006	.090	.269	—	2.0
(7) French .....	.292	.136	.187	.003	.005	.133	—

As in similar cases in the foregoing account so here, for convenience of reference the quotients obtained by dividing these coefficients by their respective probable errors are gathered together in the top half of the same table.

It is again evident that "*g*" and "*s*" alone are unable to account for all the intercorrelations found in Table X. There is "significant" "specific correlation" between English and French and between Algebra and Geometry. Further there is an amount of "specific correlation" between Art and Needlework which is very nearly significant.

The "factor pattern," in its simplest form, required by these considerations is :

<i>Subject.</i>		<i>g</i>	<i>e</i> ₁	<i>e</i> ₂	<i>e</i> ₃	<i>Specific factor.</i>
(1) English	<i>m</i> ₁	.585	<i>k</i> ₁₁	—	—	<i>k</i> ₁
(2) Algebra	<i>m</i> ₂	.563	—	<i>k</i> ₂₂	—	<i>k</i> ₂
(3) Geometry	<i>m</i> ₃	.629	—	<i>k</i> ₃₂	—	<i>k</i> ₃
(4) Botany	<i>m</i> ₄	.606	—	—	—	<i>k</i> ₄
(5) Art	<i>m</i> ₅	.372	—	—	<i>k</i> ₅₃	<i>k</i> ₅
(6) Needlework	<i>m</i> ₆	.257	—	—	<i>k</i> ₆₃	<i>k</i> ₆
(7) French	<i>m</i> ₇	.392	<i>k</i> ₇₁	—	—	<i>k</i> ₇

Adopting the methods already described there is derived the following "factor pattern" :

<i>Subject.</i>		<i>g</i>	<i>e</i> ₁	<i>e</i> ₂	<i>e</i> ₃	<i>Specific factor.</i>
(1) English	<i>m</i> ₁	.585	.700	—	—	.410
(2) Algebra	<i>m</i> ₂	.563	—	.700	—	.439
(3) Geometry	<i>m</i> ₃	.629	—	.367	—	.685
(4) Botany	<i>m</i> ₄	.606	—	—	—	.796
(5) Art	<i>m</i> ₅	.372	—	—	.800	.470
(6) Needlework	<i>m</i> ₆	.257	—	—	.303	.918
(7) French	<i>m</i> ₇	.392	.310	—	—	.866

(6) *Goodness of Fit.*—Here, too, the adequacy of these values must be ascertained.

In Table XVI are tabulated the intercorrelations calculated from this "factor pattern."

From Table X the value $2\Sigma r + n = 18.448$ and by calculation from the "factor pattern" the equivalent figure is 18.293. These differ by no more than .155.

TABLE XVI.

CALCULATED INTERCORRELATIONS.

Subject.	Ref.	m_1	m_2	m_3	m_4	m_5	m_6
(1) English	m_1	—	—	—	—	—	—
(2) Algebra	m_2	.329	—	—	—	—	—
(3) Geometry	m_3	.368	.611	—	—	—	—
(4) Botany	m_4	.355	.341	.381	—	—	—
(5) Art.....	m_5	.218	.209	.234	.225	—	—
(6) Needlework	m_6	.150	.145	.162	.156	.338	—
(7) French	m_7	.446	.221	.247	.238	.146	.101

The sum of the squares of the figures in each horizontal row is in every case the required one of unity.

The mean of the differences between the calculated and the actual correlation coefficients is .0044 and the standard deviation of the differences is .0671. Here the maximum difference in the paired correlations is .129 (a value just over twice the probable error of the coefficient).

The fit may, therefore, be considered good.

(c) *Summary of the Results.*

(1) As in the first investigation, there are not many cases of "significant" "specific" correlation or "group factors."

(2) Such "group factors" are found to exist in "significant" amount in but two cases, namely, those of (1) Algebra and Geometry, and (2) English and French. These results conform with those already obtained.

(3) There is a "suggestive," almost "significant" amount of "specific correlation" between Art and Needlework. Such a result does not enable a definite answer to be given to the question, "Do Art and Needlework constitute a group psychologically?" but it suggests that such a connection is likely.

(4) Here Geometry is most highly saturated with "g," while Art and Needlework (and particularly Needlework) are highly correlated with their "specific factors."

(To be continued.)

(Résumés in French and German will be given at the end of Part II in the next number.)

THE FUNDAMENTALS OF LEARNING.

By EDWARD L. THORNDIKE. (Bureau of Publications, Teachers' College, Columbia University.) New York, 1932. Pp. xvii+638.)

EVEN a cursory glance at Professor Thorndike's latest book would convince the reader that the investigations and results reported are of primary importance. They were made possible by a grant from the Carnegie Corporation.

One hundred and four experiments are described and the detailed account of their results requires no less than a hundred and fifty-three tables. And no wonder. For Thorndike and his staff of the Division of Psychology of the Institute of Educational Research at Columbia were engaged on their task from 1927 to 1930.

As a result of his investigations Thorndike is more convinced than ever that the solution to the problems of learning "takes the form of a new associationism, or better, since it differs deeply and widely from that older British associationism, of a new connectionism." It is, then, the formation of connexions between stimulus and motor response rather than between one idea and another which is characteristic of his theory.

This doctrine, of course, appeared in detail in his writings twenty years ago, but he has since further developed it and, what is more important, he has modified it as a result of his recent researches. This is not to imply that he has made drastic changes in his views, nevertheless, the critic who fails in the imperative duty of perusing Thorndike's latest contributions is almost bound to come to grief.

There are eighteen chapters and ten appendices in the book. They deal with the influence of the repetition of a situation ; of the repetition of a connection without belonging ; also with belonging ; the influence of the after-effects of a connection ; the influence of rewards and punishments ; readiness, identifiability, and availability ; desires, purposes, interests, and motives ; associative shifting and the conditional reflex ; adverse evidence and arguments ; and others.

The Fundamentals of Learning would prove an excellent text for seminar work with advanced students *provided* they had ample time to come to grips with the psychology of learning. It is true that the details of the various experiments make very tedious reading, but that is unavoidable, for not even William James could have converted the material into a "best seller."

"The reader who cares for conclusions rather than evidence" can attain his end by first reading Thorndike's *Human Learning*, published in January, 1931, which is much briefer, and then omitting the detailed reports in the present volume.

Thorndike's position with regard to the two so-called fundamental laws of learning may now be briefly summarized.

(1) *The Law of Exercise, or Use, or Frequency.*

It is now held that "If a certain state of affairs acts upon a man a thousand times a week for a year, he will, so far as the mere repetition of that state of affairs is concerned, probably respond no better the last week than the first" (p. 63). Thorndike, of course, admits that the repetition of a situation may cause increased familiarity with it, and perhaps a changed emotional attitude toward it, e.g., in increased self-confidence, but he concludes from his experiments that these changes are not due to the sheer repetition *in and of itself*.

Thorndike still needs the Law of Exercise, for he believes in the potency of repetition when "belongingness" is present, but not when it is absent. It therefore appears as if there is an unbridgeable gulf between the views of Thorndike and of Watson. But a further fact emerges that, however commendable it may be to discover what physiological events may explain learning, it has to be confessed that at present they are unknown. Some of Thorndike's speculations in this direction are contained in the following sentences: "It may perhaps be objected that the principle of 'belonging' is mystical, so I note here that it has, to my mind, an absolutely material basis, its neural equivalent being temporally uninterrupted conduction from one locus to another. If, for example, there is, during time T, conduction from A to X, from B to Y, and from C to Z, X will 'belong' to A, Y will 'belong' to B, and Z will 'belong' to C." But he immediately adds: "The truth of the fact of belonging is, however, entirely independent of this physiological explanation."

(2) *The Law of Effect or the Law of Satisfaction and Annoyance.*

Thorndike's first formulation of his Law of Effect twenty years ago suggested that the action of annoyers is the opposite of that of satisfiers in all respects. It is important to realize that he no longer considers that the strengthening influence of a connection by satisfying consequences is paralleled by the weakening influence of annoying consequences. He now holds that the former are more universal, inevitable, and direct; the latter more specialized, contingent upon what the annoyer in question makes the subject do, and indirect. Such a view agrees

with enlightened opinion on the practical problems of rewards and punishments, but it is satisfactory to hear that Thorndike hopes in later investigations to do justice to the problems of when and how to reward and when and how to punish, in all spheres of human management.

Thorndike notes that his Law of Effect has been adversely criticized or neglected by philosophers and physiologists, as well as by psychologists from diverse schools such as Watson, Koffka and McDougall. In this book, therefore, he employs the most effective means of meeting the situation, namely, he deals with the objections raised by his critics and he cites evidence in corroboration of his Law of Effect from a large number of experiments.

In conclusion it may be said that Thorndike is too complex a figure to belong to a single school. Can this be partly explained by remembering that he is a pupil of William James, the anticipator of both the Purposive School and the Gestalt School, and also later of Cattell, the anticipator of Behaviourism? Terms like satisfaction and belonging seem alien to behaviourism, yet it must be noted that Thorndike had denied imaginal representation to animals long before behaviourism had been founded as a school. It thus became necessary for him to form some hypothesis such as his Law of Effect in order to explain animal learning. In other words he tells us that the pleasure acts retroactively to stamp in the immediately preceding associations.

The Law of Effect is now regarded by Thorndike as *the* fundamental law of learning. He has left his critics a truly formidable task.

LL. WYNN JONES.

BOOK REVIEWS.

The Dynamics of Education: A Methodology of Progressive Educational Thought: By HILDA TABA, Ph.D. (London, Kegan Paul, Trench, Trubner and Co. 1932. xi—xvi. 259 pp. 10s. 6d.)

The author of this book has attempted to show the bearing upon education of the "new" psychology of "wholes," of processes rather than products, of becoming rather than end-states. Education, she holds, is suffering from the atomistic psychologies of past years (be they associationism or behaviourism) and from static types of philosophy. The curricula of traditional types of schools are in the main determined by watertight academic subjects and of experimental types of schools by unco-ordinated "projects," by isolated "units of learning" more or less determined by the whims of the learners. In the former types of schools educational aims and values are imposed from without and do not emerge from the educational processes themselves, in the latter types if they emerge they emerge in a very haphazard way.

It is this idea of emergence which the author stresses. Aims, information, skills, and interests, to be real and valid, must develop in the educand from his living experience, from his own interaction with his environment. In this sense neither aims, subject matter, nor interests can be prescribed, imposed, nor actually foreseen at the outset.

The author is alive to the fact that progressive education is in need of "some guide lines along which to organize the manifold educational activities, so that consistent growth will more surely result from them." She holds, however, that "the familiar guide-lines of different subject matters are not only useless but often directly obstructive to an education the main concern of which is fostering of the integrity of experience and consistent yet flexible reasoning and judgment." Values which do not similarly "evolve from the experience of those educated remain external and ineffective." How in practice she proposes to combine the doctrines of creative experience with "guide lines" is not clear to the reviewer.

The book is written in an abstruse style. Simpler expression and a greater number of concrete examples illustrating its ideas would greatly increase the usefulness of a valuable book.

M.H.

Methods of Social Study: By SIDNEY and BEATRICE WEBB. (Longmans. Pp. 263. 8s. 6d.)

This book by two of the ablest students of the working of various social institutions is a convincing proof of the gradual development of social study into a scientific pursuit.

Many books on scientific method are dull, formalized accounts—this one is an exception—it is a lively description with many apt illustrations of the methods actually used in the authors' investigations.

The various phases of a complete investigation are dealt with successively—first the province of Social Science, then (in order of the chapters), the mental equipment of the social investigator, how to study social facts, the art of note-taking, the written word, the spoken word, Royal Commissions and Committees of Enquiry as sources for the investigator, watching the institution at work, the use of statistics, verification, publication, and finally a chapter on the relation of science to the purpose of life.

The methods described, the pitfalls which may entrap an investigator, the precautions against personal bias, against formulating questions which are really "leading questions," and other dangers, are derived from an analysis of the authors' investigations into particular social institutions, but they are equally necessary in any scientific enquiry into social institutions.

Those who are conducting investigations into the working of educational institutions or are intending to do so will find much useful advice in this book, and though some may be disheartened on discovering the enormous amount of routine work involved in any thorough investigations they may be encouraged in their educational work by the success which attended the authors in their special sphere.

A.E.C.

Contemporary Schools of Psychology: By R. S. WOODWORTH. (Methuen and Co., Ltd. Pp. 247. 7s. 6d.)

This book, which has come into our hands somewhat late for review, can be warmly recommended for the student of general psychology who knows something already about the principal schools of thought of the present day but wants to clarify his ideas upon them and form a balanced judgment. Professor Woodworth deals especially with introspective psychology, behaviourism, the Gestalt psychology, psycho-analysis, and purposivism or hormic psychology.

The book is based upon lectures given upon these topics and retains some of the lecture form, but it is by no means the worse for that. The style is admirably clear and interesting, and indeed the author has achieved his desire to give as far as possible an impartial account of these schools, though this very impartiality adds weight to his own summing up and the modest expression of his own attitude. It is characteristic of his treatment (and in this we find ourselves in strong agreement with him) that he sees something of great value in each of the contending schools within any of these main branches given above. He rejects the view that one or other must be completely true and rather emphasises the fact that psychologists can learn a great deal from each and that their consistencies are more important than their differences. It is a book which should be in every psychological library.

C.W.V.

Talents and Temperament: By ANGUS MACRAE, M.A., M.B. (Nisbet and Cambridge University Press. Pp. xi+210. 5s.)

This is the best book on the practical methods of vocational guidance that has appeared for a long time. The author, with many years' experience as head of the Vocational Guidance Department of the National Institute of Industrial Psychology, combines a scientific caution, a practical outlook and a sympathetic understanding in admirable proportions.

Chapters dealing with intelligence and special ability tests are written with well-balanced judgment; further chapters, equally lucid, relate to assessment of temperament and the collection of information from all relevant sources. Finally, comes the sifting of the acquired data and the formulation of the ultimate vocational recommendation. A survey of recent experimental work on vocational guidance is given, and the conclusion is inevitable that those receiving vocational advice have much better chances of success in later life than others.

The book is written with a welcome clarity and orderly arrangement of material, while the publishers are to be congratulated on the method of presentation. It should be read by parents, teachers, and all who have the welfare of children at heart.

W.G.E.

The Theory of Speech and Language: By ALAN GARDINER, F.B.A. (Oxford, The Clarendon Press, 1932. Pp. 332. 10s. 6d. net.)

I regard this book as of the first importance, placing the author in the front rank of thinkers in his field: all the more so because he is so modest and frank about his own position.

A brief notice cannot do more than express this personal opinion: certainly if I had read Gardiner before I addressed the Harrow schoolmasters a year ago,* I should not have modified my views (and I should have been elated to find my use of the term "situation" so happily confirmed) but I should have been able to shape my argument better.

Every teacher of languages and of language method should meditate for a while on first principles under the guidance of this charming philosopher, who is at once homely, with a humour all his own, and erudite.

J.J.F.

* *Vide* this Journal, pp. 319 to 331. Vol. II, 1932.

Experimental Psychology: By JOHANNES LINDWORSKY, translated by H. R. DE SILVA. (George Allen and Unwin, Ltd. Pp. 406. 15s.)

This is a translation from the fourth edition of a book published in 1923 by the Professor of Psychology in the German University of Prague. It is particularly useful as giving to English readers a very clear and well balanced account, more especially of recent German work on thought processes, and on problems of will and feeling, such as are apt to be neglected in summaries of experimental psychology. The book is indeed much wider than its title suggests, for whilst the author constantly refers to experimental work for his basic facts, he is philosophical in treatment.

The reference we have made to the special treatment of German psychology must not be meant to imply that Professor Lindworsky has not paid great attention to writers of other nationalities. Indeed, he has included a discussion of the work of English and American writers to a greater extent than is usual in books by our Continental colleagues. The book deserves a hearty welcome.

Modern Psychologies and Education: By C. E. RAGSDALE. (New York, The Macmillan Co. Pp. 407+xviii. 12s.)

The Associate Professor of Education in the University of Wisconsin has written the latest addition to the *Experimental Education Series*, the General Editor of which, Professor M. V. O'Shea, contributes an interesting introduction. Dr. Ragsdale has attempted, with considerable success, "to reveal the points of view and the attitudes of the various schools of psychology," and "to show how educational procedures are affected by the principles presented in each school regarded separately, and in all the schools regarded collectively." The book deals, therefore, in the early chapters, with the essentials of each school, and, in the second half, with the application of each to many educational problems. The author is to be congratulated on his attempt to be impartially critical. Teachers and those engaged in the training of teachers will be interested in this volume, which would have an increased value if references to original papers were added, and if suggestions for further reading were given.

Prejudice and Impartiality: By G. C. FIELD. (Methuen. Pp. 116+vii. 2s. 6d.)

This is an admirable first volume of a series of monographs on philosophy and psychology, designed to interest "the man in the street" as well as students.

Professor Field, who is General Editor as well as author of this volume, with great clarity of expression works out a definition of prejudice, then examines the forms in which it invades the whole of our social life, hampering progress. The case for impartiality follows, the difficulty of attaining it and the opportunity and responsibility of the teacher for training the pupil in its technique.

The series should prove of interest and help to all educationists and this volume to any man who seeks self-knowledge and truth.

The Psychology of Study: By C. A. MACE. (Methuen. Pp. 96+viii. 2s. 6d.)

The student has no lack of material for study: here is a book telling him how to make the best use of it. It answers his questions on how best to memorize, how to read a book, how to deal with lectures, and treats also of the profounder subjects of originality and concentration.

It is a useful little book which summarizes the practical value to the student of the findings of the new and the experimental psychology.

Mental Deficiency Practice: By F. C. SHRUBSALL, M.A., M.D., F.R.C.P., D.P.H., and A. C. WILLIAMS, M.R.C.S., D.P.H. (University of London Press, Ltd. Pp. 352+vii. 12s. 6d. net.)

Mental Deficiency Practice is based upon a course of lectures given at the Maudsley Hospital to students for the Diploma in Psychological Medicine and on lectures given at the University of London in the courses for medical practitioners organized by the Central Association for Mental Welfare in conjunction with the University Extension Board.

The aim of the authors is to deal with the subject more particularly from the aspect of the actual steps required to effect a satisfactory disposal of any given case.

Pathology and causation are dealt with shortly but quite adequately, the authors while giving full consideration to all current ideas, refraining from statements too dogmatic on the vexed questions of heredity.

Classification is on the usual plan, but a chapter on the general description of the mentally defective is notably illuminating and likely to be especially useful in the more difficult border-line cases.

In accordance with the expressed aim of the authors diagnosis and administrative procedure are given especial prominence. The actual methods of disposal to be employed are detailed, specimens of the necessary forms being given with notes as to the most effective use of each.

In the matter of diagnosis the ground is covered with great thoroughness. The point is emphasized that diagnosis requires a complete investigation of the individual as a whole, entailing consideration of questions social, mental, and physical. To mental tests is given their full value, but the authors point out that "the assessment of mentality is not merely a matter of so many tests per cent passed, but involves observation of the whole behaviour."

Descriptions of types and of clinical appearances are clear, brief and forcible. As only one instance of this among many, we may perhaps mention the description of encephalitis lethargica with regard to clinical features and possible mental sequelæ.

As a guide to the diagnosis of defectives and their proper disposal this book is admirable. It should prove useful alike to physician and to educationalist and both should derive profit from the matter, which, while it may not be new, is presented in a manner specially directed to practical application of available methods. These methods, their results and possible improvement, are discussed ably but with moderation.

J.R.M.

The Sociology of Teaching: By WILLIAM WALKER. (Chapman and Hall. Pp. 467. 21s. 6d.)

This book is an illuminating analysis of schools as social institutions; it gives an account of the relations of schools to the community, with special chapters on the teacher in the community, parents and teachers, the fringes of the school, followed by an analytical description of life in school in which the chief topics are: the separate culture of the school, ceremonies, the four wishes in the school, crowd and mob psychology in the school, and primary groups in the school. In Part IV the teacher-pupil relationship is analysed in a way which cannot fail to interest and be of value to every teacher. Part V deals with the effect of teaching on teachers; Part VI includes a detailed summary and some suggestions.

The central theme of this book is to show that many of the difficult situations which arise are due to false conceptions of school discipline. "The school," says the author, "must stop trying to become a machine and strive to realize its destiny as a social organism" (p. 452).

Social philosophers may cavil at the author's use of the term "organism," but everyone who reads this book will feel that the author has succeeded in focussing attention from a number of standpoints upon the central problem of the school.

There are no statistics, the style is forceful and realistic, occasional repetitions occur, but this book is one which should be in the catalogue of every staff library and rarely on its shelves. Administrators and others concerned with educational institutions will undoubtedly find much of value in this excellent book. It is unfortunate that the price is so high.

A.E.C.

L'Organisation de l'Instruction publique dans 53 pays. (Bureau International d'Education, 44, rue des Maraichers, Geneva, Switzerland. Pp. 376. 10 fr. suisses.)

M. Herriot asked the International Bureau of Education (Geneva), for information on organization of education in various parts of the world, especially regarding the means offered for proceeding to higher studies. The Director of the Bureau, already in possession of quantities of material, decided that this was a matter for a special enquiry and the volume now before us is the result.

Great care has been taken to collect precise information and the mode of presentation makes it possible to get a fairly clear idea almost at a glance of the relationships between the types of institutions in any one of the fifty-three countries whose educational systems have been studied. There are numerous clear diagrams setting out the ages of scholars expected to be found in each department; the lengths of pupilage, and how primary, secondary, and higher schools, etc., are linked up. The article on each country is accompanied by a list of reliable documents which may be consulted for more exact details, but the present volume is to be recommended as a first book of reference for those interested in studies of comparative education.

A statement appears at the head of each section on the numbers in population; number of children of school age; percentage attendance at school and the age limits for compulsory attendance. At the end of the section there are essential statistics of the distribution of scholars in the different institutions provided—the numbers of such institutions and so on.

Naturally one has to accept the accuracy of much of the matter in this book on the authority of the Bureau, but judging from what one knows of certain countries with regard to which the detail is quite reliable, there is little reason to suspect inaccuracy elsewhere. A.P.B.

The First Two Years: By MARY SHIRLEY. (The University of Minnesota Press. Pp. 227. \$2, 50c.)

The book is the first of a series of three books based upon the study of twenty-five infants during the first two years of life. The method of study was a very systematic one. It included visits to the homes of the children concerned paid every week by Dr. Shirley and her collaborator, Dr. Boyd, who was a medical woman. The co-operation of the mothers was obtained but the data by which the results were made were almost entirely gathered by direct observation. The method thus combines some of the advantages of the continuous method of study with some advantages of the cross section method. Professor Shirley's treatment is cautious and scientific. She is fully aware of the many difficulties and dangers of this kind of study, and that makes her conclusions all the more interesting and valuable. In the last section dealing with theoretical implications perhaps the most interesting conclusion is her emphasis upon the importance of mere maturation in determining the development of motor skill, and upon the importance also of large individual differences in capacities shown by motor co-ordination appearing too early to be ascribable to practice. She thinks that so far as learning does occur in motor development it takes place chiefly through practising the elements of the act and not through practising the act itself, an observation that has an interesting connection with the position of the Gestalt psychologists. C.W.V.

The Enrichment of the English Curriculum: By R. L. LYMAN. Supplementary Educational Monographs, No. 39. (University of Chicago. Pp. 251. \$2.00.)

This monograph is concerned with various attempts in America during the last two decades to "broaden the scope of English instruction in elementary schools, secondary schools, and colleges." To judge from the activities described, there is a healthy realization in America that English, as a subject of instruction, is the business, not only of the English specialist, but of every teacher. The general

cultural value of a sound training in English language and literature is emphasized, and there is also evident a determination that the rising generation should perceive the possible relation of such a training to material success in life (e.g., correlation of vocational guidance and composition, pp. 153, *et seq.*).

The English reader must needs admire the energy and freshness with which experiments such as those described are conducted. Yet it is perhaps impossible for one bred in far different conditions not to feel a little dismayed by the over-classification and the over-systematization everywhere apparent. Too much correlation may be as dangerous as too little or none at all, and would not much of the work described be rendered superfluous if a higher standard of general education were demanded from all teachers? After reading this book one remembers with relief the gracious figure of Bridget Elia, browsing at will, "without much selection or prohibition" upon her "fair and wholesome pasturage" of "good old English reading," and the realization that there are other ways than those outlined of "acquiring" English is distinctly comforting.

Even this monograph is an ironic witness against itself. Its English ought to be beyond reproach. It contains, however, much of that unfortunate "jargon" which renders so many books about teaching unacceptable to the ordinary reader.

Commencement Activities: By H. C. MCKOWN. (New York, Macmillan Co. Pp. 310. 12s. 6d.)

"Speech Days" in America, to judge by this book, must be very terrible things. In every place of education, from the elementary school to the university, a fortnight or so is devoted to preparations, and several days to the actual celebrations; comic papers hold the proceedings up to ridicule, large audiences listen wearily to a flood of the worst schoolboy oratory, and harassed Deans of Faculties try to compose the jealousies of the different religious sects whose ministers all think they ought to have been asked to preach the baccalaureate sermon. If the commencement activities are unsuccessful, and if public interest is not sufficiently stimulated, the funds necessary for further buildings and advanced courses of study suffer—advertisement, honour, peace are alike involved. This book is a complete guide through this thorny jungle. It might well be invaluable in America. In this country, where our problems are so much simpler, it is fortunately unnecessary.

Hygiene and Health Education for Training Colleges: By M. B. DAVIES. (Longmans, Green and Co. 424 pp. 6s.)

Both teachers and students of hygiene in training colleges will welcome this most interesting book.

The author has provided a splendid foundation from which to start a course of study which is of paramount importance at this time, that is a sound working knowledge of the physiology and hygiene of the human body especially in relation to the school child.

This book deals with the physiological systems of the body and in each case shows how they may be affected during school life.

It is interesting to notice that two chapters are devoted to sex education and eugenics, subjects so important and yet so often neglected, or passed over in a very cursory manner.

The book concludes with a useful chapter on first aid and a comprehensive bibliography.

Change of Interests with Age: By EDWARD K. STRONG, junr. (Humphrey Milford and Stanford University Press. Pp. 235+xvii. 24s.)

This is a report of a very interesting enquiry upon original lines. The interests studied are those of men between twenty and seventy, and include not only interests in occupations but in languages, games, physical skill, school subjects, and social interests. The occupational aspect is a prominent one, but there are many items which will interest the general student of human nature.

One of the most striking general results is the slight changes of interests among men at about twenty-five and at fifty-five years of age, from which it is inferred that interests are not greatly affected by increasing age within this period in a given occupation, though such changes as there are seem to be due to age and not to occupation.

A Modern Infant School: By M. J. WELLOCK. (University of London Press. Pp. 204. 6s.)

Miss Wellock is a practical and successful teacher and writes as such. The book contains an account of the different activities practised in her school and is illustrated by photographs of the children in their daily school life.

The subjects dealt with include language, reading, number, nature study, music, literature, and in connection with all of them there are most useful and practical suggestions and descriptions of occupations. The school described must be full of varied and pleasant activity, and any teacher or student would find much of interest in this account of it, and could not fail to be stimulated into trying some of the methods for himself.

The Teaching of Elementary Algebra: By C. U. DURRELL, M.A. (G. Bell and Sons, Ltd., London, 1931. Pp. 135. 3s. 6d.)

This book, to quote the author's own words, is a practical teaching manual intended for teachers of very little experience. As such it admirably fulfils its purpose: indeed the book should prove helpful to teachers of riper experience, who, feeling in danger of becoming stereotyped, seek to catch something of the spirit of modern methods of teaching mathematics.

The contents cover the syllabus of the first two years of algebra, the methods suggested are rational, clear and practical, and bear the mark of having been tested by the author's own teaching experience. A useful bibliography is appended.

M.H.

Standard Practices in Teaching: By W. C. BAGLEY and M. E. MACDONALD. (New York, The Macmillan Co. Pp. 189+vi. 10s. net.)

The sub-title of this book clearly indicates its aim and scope: "A summary of the standards generally recognized as governing good practice in typical teaching procedures." The work is of the high standard associated with one of the authors, and, in rather dogmatic terms, states the principles underlying successful teaching practice. The student in training and the experienced teacher should learn a great deal from a careful and critical study of this little book.

Education Through Recreation: By L. P. JACKS. (London, University of London Press. Pp. 148. 3s. 6d.)

Dr. Jacks, whose writings on the subject of education and leisure are well-known, has collected into this volume some of the addresses he delivered in many American cities under the auspices of the National Recreational Association. They are thus essentially popular, but are interesting and stimulating. The author does not always carry conviction, but many of his criticisms are penetrating and the suggestions he makes must be given consideration in determining the educational and social schemes for the immediate future.

The Art of Effective Speech: By Mrs. A. M. HENDERSON. (London, University of London Press. Pp. 110+x.)

Mrs. Henderson has added an extremely useful little practical guide to the many publications dealing with this very difficult art. She deals with her subject under the four main divisions of Breathing, Articulation, Interpretation, and Voice-Colouring. Teachers and students, as well as others interested in the art of speaking, will find much of value in this book.

The Essentials of Teaching: By H. S. PERERA. (London, Longmans, Green and Co., Ltd. Pp. 92+xii. 3s. 0d.)

The writer of this interesting and instructive little handbook is the Divisional Inspector of Schools in Ceylon and Principal of the Government Training College at Colombo. The book will usefully fulfil the double purpose the author evidently had in mind when he set out to write it; it is a stimulating little book for students about to begin their work in schools, and it is sufficiently provocative to compel experienced teachers to reconsider their aims and methods in the light of increased knowledge. The Director of Education for Ceylon contributes a suggestive Introduction.

Kleinkinder Tests: Entwicklungstests vom 1 bis 6 Lebensjahr: Bei CHARLOTTE BÜHLER und HILDEGARD HETZER. (J. A. Barth, Leipzig, 1932, Pp. 189. Price not stated.)

This book is a valuable contribution towards the study of the development of intelligence in young children. The tests for the first and second years of life which Professor Charlotte Bühler had already published have been revised in the light of later experience, and new sets of tests for the years from three to six are provided. There is a full description given of the apparatus needed for the tests, and technical instructions as to the method of applying them.

Ten tests are given for each age group; ten for each month of the first year, except that the ninth and tenth months are taken together, and also the eleventh and twelfth. After that there are ten tests for each of the periods thirteen to fifteen months, sixteen to eighteen, and nineteen to twenty-four months; and then ten tests for each year.

An attractive feature of the tests is that so many of them are of a type likely to be very welcome to the children. Indeed, they would appeal to them as play and games. Pictures are frequently used in some way. Some of the Binet tests are included, but on the whole the authors' tests would be likely to depend much less than would some of Binet's on specific experience and school or home instruction.

The children used for experimentation and standardization were drawn from the poorer sections of the people.

No doubt some revision of the placing of the tests will be necessary when they have been applied to larger numbers; for example, for a number of the age stages, the selection of tests was based on only twenty or twenty-five children of the given age group.

In the meantime, Professor Charlotte Bühler is to be congratulated on adding, with the valuable collaboration of Fraulein Hetzer, further material to her important contributions to the psychology of early childhood. C.W.V.

FOREIGN JOURNALS.

Zeitschrift für Pädagogische Psychologie. 33 Jahrg. Nr. 11. November, 1932.

Professor Aloys Fischer of Munich writes on case studies in teacher training—"Die Kasuistik im Rahmen der pädagogischen Berufsausbildung." Experimental college training ought to begin not on the lay model, but with the living object. The medical student is prepared by studies of animal dissections and on models before he reaches hospital patients. New methods have to be tested on mouse and guinea-pig before they are risked on patients. The unskilled student is not responsible for treatment. With educational training it is otherwise, what the student in training says and does may have consequences for the patient. The student is not only an observer, the patient may be a sufferer.

The surgical demonstration on a living but unconscious subject is not prejudiced merely because students stand round as spectators. In a clinical demonstration the adult patient can understand why he is used for exhibition. By analogy, one might seek for a demonstration of educational processes by some master educator before

his audience of student teachers. But an exhibition education is totally different from an exhibition surgical operation. The essence of the educational act involves a confidential intimacy between teacher and taught, and the certainty of their mutual discretion. A searching conversation ending perhaps in censure and yet in charity would be altered if carried on in public. Every educational process is bound by conditions of time and place and cannot be postponed or transposed to an operating theatre. Nor can we train boys to play mechanical parts in a staged demonstration lesson in which the sham education process is no longer serious. There is no demonstration-education, and it is dangerous to submit educational processes to spectators.

Any attempt to bring the reality of professional work into the lecture-room for the study of pedagogics can be undertaken only Interesting cases of stammering or of mental deficiency can without risk of grave damage to themselves. Children are arch objects even under homely conditions; as exhibition are liable to acquire mental twists undetected at the time.

Observational instruction in human variation can be obtained in unobtrusive ways through lantern slides, preparing the way for visits to schools and institutions where students can associate with the inmates in less artificial ways, and store up some quantity of observations without making a show of those they observe. There are other substitute sources for the rejected educational exhibit method and among these are: (1) the student's own memory of his own education. The student can report and anonymously as for himself or a schoolfellow some "case" involving a punishment with all relevant particulars of age, class, environment, etc., perhaps involving the conflicting doctrines of co-operation and of independent work. (2) Again many teachers in training already have some teaching experience if only with younger brothers in the home and their "cases" can be presented for discussion in some pedagogic "Kolloquium" in which it is often a great advantage to have a few older visitors. (3) Again there are experiences of self-education which can be brought into focus for discussion, e.g., how to train oneself to punctuality. (4) Not least there are literary reports from all the centuries, and especially the last two generations, enthusiastic or satirical, biography, or drama, or fiction, of wonder-children and workhouse children, from many countries and especially Western Europe and America. All these allow some substitution of real case studies for fictitious children and encourage students to the accurate written report of their observations. H.R.

GROUP FACTORS AMONG ABILITIES INVOLVED IN A SCHOOL CERTIFICATE EXAMINATION.*

By J. H. WILSON.

PART II.

III.—*Third series of subjects: English, French, Arithmetic, Geometry, Chemistry, Art and Handicraft.*

(a) *Data of experiment*; (b) *Analysis of the data, Tetrad differences, "Factor pattern," Goodness of fit*; (c) *Summary of results.*

IV.—*Comparative results.*

V.—*General conclusions and remarks.*

III. THIRD SERIES OF SUBJECTS.

The third investigation made use of English, French, Arithmetic, Algebra, Geometry, Chemistry, Art and Handicraft.

(a) *Data of the Experiment.*

Once again the data were derived from the source described in the first part of this paper. There were, however, only seventy-seven candidates who had taken all these subjects.

(b) *Analysis of the Data.*

The intercorrelations for these eight subjects are presented in Table XVII.

TABLE XVII.
INTERCORRELATIONS.

Subject.	Eng- lish.	French	Arith- metic.	Al- gebra.	Geo- metry.	Chem- istry.	Art.
(1) English	—	—	—	—	—	—	—
(2) French .....	.386	—	—	—	—	—	—
(3) Arithmetic .....	.199	.426	—	—	—	—	—
(4) Algebra	-.007	.438	.700	—	—	—	—
(5) Geometry .....	.190	.539	.545	.688	—	—	—
(6) Chemistry .....	.325	.479	.369	.402	.606	—	—
(7) Art .....	.005	.061	.128	.119	.225	.175	—
(8) Handicraft	-.245	.084	-.072	.180	.283	.348	.418

(1) *Approximate Method.*—Following the routine adhered to in the two previous enquiries, the figures in Table XVIII and Table XIX were first obtained.

* I express my deep indebtedness to Professor Godfrey Thomson for many very helpful suggestions.

TABLES XVIII AND XIX.

"SPECIFIC CORRELATION" (TENTATIVE) AND QUOTIENTS.

Subject.	Eng- lish.	French	Arith- metic.	Al- gebra.	Geo- metry.	Chem- istry.	Art.	Handi- craft.
(1) English	—	5.3	1.8	1.9	1.5	4.5	0.5	3.0
(2) French .....	.381	—	0.1	0.1	1.1	0.1	2.0	1.3
(3) Arithmetic ....	.134	.012	—	7.7	1.0	3.1	0.9	1.5
(4) Algebra	-.146	.014	.476	—	4.0	2.8	1.1	0.3
(5) Geometry ....	.119	-.083	-.072	.286	—	2.4	0.3	2.0
(6) Chemistry ....	.323	.014	-.239	-.203	-.183	—	0.5	3.5
(7) Art	-.037	-.151	-.061	.080	-.021	-.041	—	5.5
(8) Handicraft	-.294	-.097	-.116	.026	.151	.260	.378	—

(2) *Tetrad Differences.*—Examination of these results leads to the suggestion that the following groups of subjects might serve as "reference abilities," i.e., exhibit no intercorrelation other than that due to "g":

English, one mathematical subject, Chemistry, and either Art or Handicraft and similar groups with French in place of English.

To these groups must be applied the tetrad difference criterion.

From them there arise thirty-six tetrad differences. Of these, those involving French satisfy the criterion but of those involving English some do, while some do not. These exceptional cases were found attached to those groups which combined both English and Handicraft. For this reason these groups were not used as "reference abilities" from which to calculate values of r_{ag} and r_{aSa} .

Fortunately, however, there remain sufficient groups to enable coefficients of saturation to be evaluated without recourse to any other method than that explained in the first part of this investigation.

The values of the saturation coefficients thus obtained, together with the corresponding values of r_{aSa} are collected in Table XX. The equation is $r_{ag}^2 = 1 - r_{aSa}^2$.

TABLE XX.

"COEFFICIENTS OF SATURATION" WITH "g" AND WITH THE "SPECIFIC FACTORS."

Subject.	r_{ag}	r_{aSa}
(1) English .....	.285	.959
(2) French .....	.581	.813
(3) Arithmetic .....	.541	.839
(4) Algebra .....	.610	.795
(5) Geometry .....	.838	.534
(6) Chemistry .....	.817	.565
(7) Art .....	.186	.982
(8) Handicraft .....	.262	.965

(3) "*Specific Correlation.*"—Armed with these values, the amounts of the "specific correlation" for each pair of the subjects are readily evaluated. They are given in Table XXI, and in Table XXII (amalgamated with Table XXI) the quotients are to be found.

It will be observed that the coefficient for English and Handicraft is negative and is nearly "significant." This result accounts for the difficulty experienced when treating the tetrad differences, to which reference has already been made.

TABLES XXI AND XXII.

COEFFICIENTS OF "SPECIFIC CORRELATION" AND QUOTIENTS.

Subject.	Eng- lish.	French	Arith- metic.	Al- gebra.	Geo- metry.	Chem- istry.	Art.	Handi- craft.
(1) English	—	4.0	1.0	3.3	1.0	2.2	0.6	4.6
(2) French .....	.282	—	2.2	1.7	1.6	0.1	0.7	1.3
(3) Arithmetic .....	.056	.164	—	10.4	14.4	2.1	0.4	1.0
(4) Algebra	-.237	.130	.554	—	6.6	2.9	0.0	0.3
(5) Geometry	-.078	.119	.651	.416	—	3.6	1.7	1.6
(6) Chemistry .....	.169	.009	-.154	-.213	-.261	—	0.5	3.4
(7) Art	-.050	-.058	.032	.001	.131	.041	—	6.1
(8) Handicraft	-.320	-.086	-.086	.026	.122	.245	.389	—

(4) *Further Criteria.*—Once again there has been assumed the presence of a single common "factor." It is necessary, therefore, to set up a "factor pattern" and to test its adequacy to account for the observed facts.

Following the same procedure as heretofore the suggested "factor pattern" has this form :

Subject.	Ref.	r_{ag}	e_1	e_2	e_3	Specific factor.
(1) English	m_1	.285	h_{11}	—	—	h_1
(2) French	m_2	.581	h_{21}	—	—	h_2
(3) Arithmetic	m_3	.541	—	h_{32}	—	h_3
(4) Algebra	m_4	.610	—	h_{42}	—	h_4
(5) Geometry	m_5	.838	—	h_{52}	—	h_5
(6) Chemistry	m_6	.817	—	—	—	h_6
(7) Art	m_7	.186	—	—	h_{73}	h_7
(8) Handicraft	m_8	.262	—	—	h_{83}	h_8

The values for the coefficients are as follows :

Subject.	Ref.	r_{ag}	e_1	e_2	e_3	Specific factor.
(1) English	m_1	.285	.447	—	—	.847
(2) French	m_2	.581	.403	—	—	.707
(3) Arithmetic	m_3	.541	—	.438	—	.718
(4) Algebra	m_4	.610	—	.794	—	0
(5) Geometry	m_5	.838	—	.210	—	.504
(6) Chemistry	m_6	.817	—	—	—	.576
(7) Art... ..	m_7	.186	—	—	.556	.810
(8) Handicraft	m_8	.262	—	—	.657	.707

(5) *Goodness of Fit.*—In Table XXIII are given the intercorrelations of the variables as calculated from the values in the "factor pattern."

TABLE XXIII.
CALCULATED INTERCORRELATIONS.

Subject.	Ref.	m_1	m_2	m_3	m_4	m_5	m_6	m_7
(1) English	m_1	—	—	—	—	—	—	—
(2) French.....	m_2	.347	—	—	—	—	—	—
(3) Arithmetic	m_3	.154	.314	—	—	—	—	—
(4) Algebra	m_4	.174	.354	.678	—	—	—	—
(5) Geometry	m_5	.239	.487	.545	.678	—	—	—
(6) Chemistry	m_6	.233	.475	.442	.498	.685	—	—
(7) Art	m_7	.053	.108	.101	.114	.156	.152	—
(8) Handicraft	m_8	.075	.152	.142	.160	.220	.214	.414

The value of $2\Sigma r+n$ is in this case 24.276. From the "factor pattern" the corresponding quantity is 24.465. The difference is .189.

The mean of the differences of the paired correlation coefficients is .0141 and the standard deviation of these differences is .0860. The greatest difference between the paired coefficients is .315, a value about four times the probable error.

Once more the sum of the squares of the figures in each horizontal row attains the magnitude one as required by theory.

The fit may, therefore, be considered acceptable.

(c) Summary of Results.

(1) Once again there are few "group factors." The mathematical subjects exhibit such "specific correlation" in "significant" amount as they have already done in the previous experiments. In addition, there is evidence of a "group factor" between Art and Handicraft.

(2) The figure for English and French is now only "suggestive."

(3) In this experiment, as in the last, Geometry has the biggest saturation with "g," while Art and Handicraft both exhibit high correlation with their respective "specific factors."

IV. COMPARATIVE RESULTS.

The main statistical results, namely values of r_{ag} and r_{aSa} , have been obtained from three different sets of pupils. Analogous results are collected in Table XXIV.

It will be seen that discrepancies occur. The same examination papers were taken by each of the groups and the only variables are the students (not necessarily the same in each group) and their number. The values of r_{aSa} depend upon those for r_{ag} . The differences are, however, readily accounted for by the magnitude of the probable errors involved.

TABLE XXIV.
COMPARATIVE RESULTS.

Subject.	Set 1, 371 pupils.		Set 2, 110 pupils.		Set 3, 77 pupils.	
	r_{ag}	r_{aSa}	r_{ag}	r_{aSa}	r_{ag}	r_{aSa}
(1) English	—	—	$.585 \pm .043$	.811	$.285 \pm .070$	.959
(2) French	$.575 \pm .024$	.820	$.392 \pm .054$	.920	$.581 \pm .050$	.813
(3) Algebra	$.591 \pm .022$	.807	$.563 \pm .044$	.826	$.610 \pm .047$	.795
(4) Arithmetic	$.579 \pm .024$	.815	—	—	$.541 \pm .053$	.839
(5) Geometry	$.575 \pm .024$	.820	$.629 \pm .040$	.777	$.838 \pm .023$	.534
(6) Art	—	—	$.372 \pm .055$	.928	$.186 \pm .075$	.982

V. GENERAL REMARKS.

(1) An attempt has been made to account for the intercorrelations found among three sets of data, taken from a School Certificate Examination, and involving English, History, Geography, French, Mathematics, Chemistry, Botany, Art, Handicraft, Needlework. To account for the intercorrelations of these subjects the measure of each subject has been considered to be due to the influence of two or more components, and the problem thereupon became that of finding the number of these components and their relative weights in producing the measures. The adequacy of the solution has been tested by the degree to which the values assigned to the components reproduced the original intercorrelations. In effecting the solution, use has been made of direct calculation in many instances; trial and error in others; and throughout an effort has been made to employ the smallest number of components and to be consistent in the allotment of them in the three sets of data.

(2) The purpose of such an analysis is to find which subjects function in a unitary manner so that wide-ranging generalities may be predicted : thus making examinations satisfy the most fundamental scientific requirement.

(3) Adequate goodness of fit has been obtained by the employment in each set of data of (1) a single component common to all subjects, (2) components specific or peculiar to each subject, and (3) components which occur in a group of two or three of the subjects. These last components have been found in the case of English and History, English and French, the mathematical subjects, Art and Handicraft, and Needlework and Handicraft.

(4) With the given data it is impossible to say whether the common component or capacity in one set of data is the same as that in either or both of the others. For purposes of interpretation, lacking further evidence, one common capacity* might be postulated, for such an hypothesis would obey the law of parsimony of assumptions.

(5) As to whether Art, Needlework and Handicraft have a group component or ability and thus constitute a single functional unity the evidence is incomplete because no investigation could be made with Handicraft and Needlework on account of the former subject being confined to boys and the latter to girls.

(6) The number of the pupils involved in the analysis was restricted by introducing the subjects Art, Handicraft and Needlework, which are taken by fewer students than those taking many of the other subjects.† Restricting the number of candidates affects the magnitude of the probable errors. The results of the investigation must, therefore, be considered tentative rather than final.

(7) In endeavouring to account for the group ability or component (additional to that common to all the subjects) which was discovered between English and History, it was found impossible to explain it in terms of a wide language factor or even in terms of verbalness or abstraction. A more feasible explanation is that an interest in English is often accompanied by an interest in History.‡ Also the examiners in History§

* "Capacity" has been used in preference to "ability" for this general component because such a component can only manifest itself through special channels : in other words what is general is a capacity : all abilities are special.

† Due in some measure to restrictions imposed by matriculation requirements : vide also C. W. Valentine, *The Reliability of Examinations* (University of London Press), p. 23.

‡ Vide V. Hazlitt, *Ability* (Methuen), Ch. VI and VII, p. 55 to p. 80. The author considers the importance of the child's early environmental influences upon its special abilities and interests and advances the view that with persons of good general capacity the chances are in favour of the interests being wide.

§ In this connection see also C. W. Valentine, loc. cit., p. 28.

may have been influenced by the presentation of the subject matter—the accuracy of the spelling, the style and phraseology.

The case of English and French is less curious for both are languages.

In that of the mathematical subjects there is some variance with the results of other workers ; but it must be remembered that in Algebra and Geometry as often presented in examinations of this kind there is frequently an admixture of much that is purely arithmetical and, in like manner, in the Geometry there is much use of the symbolization of Algebra. The investigations referred to dealt with the purer aspects of these subjects.*

No explanation has been offered for the group components found in Needlework, Handicraft and Art. A plausible hypothesis is to be found in attributing them to the influence of instincts and interests. In mechanical ability a wide group component has been found which has received such an explanation.† Before accepting such an hypothesis it would be wise to remember that music—where not only endowment but environmental encouragement do differ from individual to individual—has been thoroughly explored without finding an analogous broad ability.

(8) Further interpretation of these results involves the question as to what the examination measures. This question involves (1) the extent to which the examination, or a similar one, given a few days later would give the same results, and (2) the extent to which the examination measures that which it purports to measure.

The first part of this question embraces such problems as the reliability (in its strict sense) of the examination, the objectivity of its marking, the influence upon its findings of the emotional attitude of the candidates towards it and other problems. Adequate treatment of them has been given elsewhere.‡ The main points to bear in mind here are that the examination papers themselves may not be representative tests of the various subjects and that the vagaries of the marking of the different examiners are unknown quantities. Very different figures may be obtained from other tests in the same series of subjects. Here the results of one particular examination are dealt with and, as such, the analysis provides a useful though rough guide to the components to be looked for in the various school subjects.

* *Vide* C. Spearman, *The Abilities of Man* (Macmillan), p. 30 et seq. and references there given ; also Valentine, *loc. cit.*, p. 178 (Appendix 1 (d)).

† *Vide* M. McFarlane, "A Study of Practical Ability." *Brit. Journ. of Psychology*, 1925. Mon. Suppl., Vol. III, No. 8.

‡ e.g., In the experimental field there is the recent admirable work of C. W. Valentine, *loc. cit.*, particularly Ch. II.

The second part of the question focusses attention upon the relative prominence of the general function, component or capacity common to all subjects and that specific or peculiar to one.

Examination of Tables VII, XIII, and XX shows that in all cases but one the partial correlation of the subject with the common or general component is less than that with its other elements. Success in the various subjects of this examination depends more upon specific abilities than upon general capacity. In those of Art, Needlework and Handicraft the values of the partial correlations with their specific parts are so high as to suggest that for satisfactory tests of the specific abilities here involved there may not be long to wait. The same cannot be said of the other subjects, for the magnitude of the probable error is such that for adequate measurement of a specific component its partial correlation with the subject must attain at least the value .990.

The conclusion to be arrived at is that the examination measures neither the pupils' general capacity nor their specific abilities at all adequately.

On account of the mathematical connection between the relative weights of the components of a subject it follows that any improvement in the magnitude of the influence of the general function may only be attained by a sacrifice in that of the specific ability. Both cannot be measured effectively by the same examination paper. Examiners should, therefore, devote their energies to constructing, on the one hand, more and more efficient tests of the general function and, on the other, to producing better and still better measures of the specific abilities involved. An examination might then be given in two parts,* one assessing the general capacity of the candidates and the other their specific abilities.

The great merit of the former lies in the fact that in investigations using intelligence tests, the amount of the common capacity possessed by a pupil has been found to remain, relative to other pupils, constant,† and the same may be true of the common element found in the school subjects. On Spearman's view of the nature of this common capacity the subject most highly saturated with it involves the most important relations in the most varied manner. Educationally, perhaps, such a subject would be the most valuable and, if so, a means of selecting the subjects of the school curriculum would be to hand. With the same

* The same conclusion has been reached by Professor Valentine by a different line of argument, *vide loc. cit.*, pp. 30, 34, and 95.

† *Vide* C. S. Slocombe, "The Constancy of 'g' General Intelligence." *Brit. Journ. Psych.*, Vol. XVII, Part 2, October, 1926, p. 93.

Also thesis by the author in the London University Library on "Influence of Coaching and Practice on Intelligence Tests," 1929.

assumption as to the strictness of the parallel, additional advantages for this type of test are to be found in that (1) their results are not readily susceptible to the influence of *ad hoc* preparation,* and they supply a more reliable prognosis of later academical success† than do those of ordinary examinations, and (2) investigations into the principles to be followed in their formation have been instituted.‡

As to the latter, the discovery of efficient tests of special abilities is theoretically§ and practically|| of the utmost importance. Theoretically, because the nature of these special abilities is still undetermined, and practically, because upon the training of such abilities are students most likely to be differentiated for vocational guidance and for later academic success, the more especially as the general capacities of the students have already been graded by the school system of promotion. Such tests are being devised** and may eventually prove of further help in improving the validity of examinations and in elucidating the nature of special ability.

(9) There still remains one question upon which these results may throw a little light. In the examination the subjects are grouped. Thus in Group I are found English, History, Scripture and (sometimes) Geography; in Group II, Languages other than English; Group III contains Mathematics and the sciences; Group IV has assigned to it Music, Art, Handicraft and the Domestic Sciences. The question arises as to whether such groups are to be considered as possessing a unitary function. The evidence here presented points to a negative answer in all cases except, perhaps, in that of Group IV.

* *Vide* the author's thesis just quoted. In this connection reference may be made to Professor Valentine's remarks on the results of special coaching or cramming, loc. cit., p. 33; also see his references on p. 99 and remarks on p. 145.

† The general problem of the relation between general capacity and scholastic achievement is a very wide one, with a considerable literature. The reader is therefore referred to R. Pintner, *Intelligence Testing* (London, 1924), p. 276, and subsequent references.

‡ *Vide* C. Spearman, *The Nature of Intelligence and the Principles of Cognition* (Macmillan); J. J. Strasheim, *A New Method of Mental Testing* (Warwick and York), 1926; S. A. Hamid, "Some Factors of Effectiveness in Mental ('Intelligence') Tests," *Brit. Journ. Psych.*, Vol. XVI, Part 2, p. 100. V. Hazlitt, *Ability* (Methuen), p. 76.

§ For example, V. Hazlitt, loc. cit., Ch. V and VI.

|| *Vide* for example, V. Hazlitt, loc. cit. pp. 77 to 79; also C. W. Valentine, loc. cit. p. 79, p. 165, p. 171, and especially p. 145.

** *Vide* for example, references in Professor Valentine's book, p. 96. Others for University Students are given in Miss Hazlitt's book, Part 2, Ch. II.

RÉSUMÉ.LES FACTEURS CENTRAUX PARMI LES APTITUDES IMPLIQUÉES
DANS UN EXAMEN DU "SCHOOL CERTIFICATE."

On a analysé trois groupes de données recueillies d'un examen du "School Certificate." Les sujets compris : l'Anglais ; l'Histoire ; la Géographie ; le Français ; l'Algèbre ; la Géométrie ; la Chimie ; la Botanique ; le Dessin ; le Travail de l'Aiguille ; et les Travaux Manuels.

L'analyse a tenté (en attribuant à l'influence d'un constituant, ou de plusieurs, la mesure de chaque branche) d'expliquer les corrélations entre ces branches. On a estimé la valeur relative des constituants, et leur validité a été éprouvée par le degré auquel ils reproduisent la corrélation originelle.

Les données ont ainsi été expliquées en termes d'une capacité ou d'une fonction commune et générale, de constituants ou d'aptitudes spéciaux, et de certains constituants ou aptitudes centraux, qui sont communs à deux branches ou à plus encore. Une aptitude commune se révéla parmi les branches des mathématiques, une entre l'Anglais et l'Histoire, une troisième entre l'Anglais et le Français, une quatrième entre le Dessin et les Travaux Manuels et une cinquième entre le Dessin et le Travail à l'Aiguille.

On examine ces aptitudes communes, et l'on considère l'importance de l'ensemble des résultats pour la théorie et la pratique de la pédagogie.

ÜBERSICHT.GRUPPENFAKTOREN UNTER IN EINER ENGLISCHEN ERSTEN
SCHULPRÜFUNG ENTHALTENEN FÄHIGKEITEN.

Man hat drei von einer englischen Ersten Prüfung entnommene Gattungen von Gegebenheiten analysiert. Die in Betracht gezogenen Lehrfächer waren Englisch, Geschichte, Erdkunde, Französisch, Algebra, Geometrie, Chemie, Pflanzenkunde, Zeichnen, Nadelarbeit und Handarbeit.

Die Analyse hat versucht (indem man die Weite jedes Gegenstands dem Einfluss zweier oder mehrerer Komponenten zuschreibt) die Interkorrelationen dieser Gegenstände zu erklären. Relative Werte der Bestandteile sind abgeschätzt und ihre Zulänglichkeit ist durch den Grad geprüft worden, in dem sie die ursprünglichen Korrelationen wieder hervorbrachten.

Man hat die Gegebenheiten also mit Worten einer allgemeinen Fähigkeit oder Funktion, besonderer Bestandteile oder Fähigkeiten und gewisser Gruppenbestandteile oder Fähigkeiten, die zwei oder mehreren Gegenständen gemeinsam sind, auseinandergesetzt. Eine Gruppenfähigkeit wurde unter den mathematischen Fächern gefunden, eine zwischen Englisch und Französisch, eine vierte zwischen Zeichnen und Handarbeit und eine fünfte zwischen Zeichnen und Nähen.

Diese Gruppenfähigkeiten werden besprochen und die Tragweite sämtlicher Ergebnisse für die erzieherische Theorie und Praxis wird in Betracht gezogen.

PRE-COLLEGE TEACHING EXPERIENCE AND OTHER FACTORS IN THE TEACHING SUCCESS OF UNIVERSITY STUDENTS.

By ARTHUR PINSENT.

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PART I.

- I.—Outline of problem and data available for analysis.
- II.—Effect of pre-college teaching experience on teaching grade achieved by students in professional year.
- III.—Relative influence of :
 - (a) Age.
 - (b) Factors measured by intelligence test.
 - (c) Academic ability.
 - (d) Theoretical instruction in professional subjects.
- IV.—Summary of results and conclusions. (Part I.)

I.—OUTLINE OF PROBLEM AND DATA AVAILABLE FOR ANALYSIS.

THE improvement of the opportunities for secondary training since 1902, and more particularly the development of higher certificate courses since about 1922, have altered the conditions of recruitment for the teaching profession, and raised problems in connection with the professional preparation of teachers. One problem is connected with the value of practical teaching experience obtained before the professional training of the intending teacher. There used to be no question about this. The experience was considered essential for elementary, but quite unnecessary for secondary school teachers. Now, however, there is a conflict of opinion. This problem was discussed by the Departmental Committee on the Training of Teachers. It was found that "on the one hand the teachers concerned in the elementary schools, secondary schools and training colleges are as a whole against it, though there are individual exceptions. Its principal supporters are found among witnesses representing local authorities, though these are by no means unanimous."* It is asserted that "no theoretical training is likely to be realized and properly assimilated by those who receive it unless

* Report, pp. 71, 72.

they have had experience of practical work and its difficulties beforehand."* Further it is supposed to eliminate those who are unfit for the work of teaching. Some teachers have stated that they would have been able to understand the professional theory courses better if they had had previous practical experience.†

The Departmental Report suggests, however, that the argument that practice should precede theory is not necessarily true of all or any practice. Bad habits of teaching and a false perspective may be acquired and practice under difficulties at the beginning without a clear notion of the end in view may be unfairly discouraging.‡

The problem was brought to my notice in connection with the selection of candidates for admission to a University Department. It has been the custom in this department to prefer candidates for admission who have had some teaching experience in some recognized capacity. However, some of the Heads of secondary schools from which the candidates came expressed the opinion strongly that from their observation of individual pupils they feared that some of the candidates who were admitted on the ground of previous experience and matriculation were not so good as others who had remained at school to pursue the higher certificate courses. To this it might be objected that since the secondary school Head was strongly interested in developing his higher courses he would naturally wish to keep as many pupils as possible in school for the extended course. Further, there was the possibility that the Heads and the subject teachers in the secondary schools would be prejudiced against the pre-college experience on the ground that the break of a year or more in the continuity of the studies of the prospective teachers would interfere with their chances of obtaining a good honours degree at the end of their academic period. However, the opinions against the preference of candidates with the teaching experience had to be weighed carefully and if the system of selection was to be continued it must be justified.

So far as one could ascertain, most, if not all of the views for or against the pre-college experience were based upon opinion which could easily be influenced by prejudice. There seemed to be no concrete

* Some training colleges and university departments give preference to candidates for admission who have had some practical teaching experience. See, for example, the prospectus of the City of Sheffield Training College.

Examples of the attitude of L.E.A. officials may be seen in reports of public speeches by the Director for Burnley (*Times Educational Supplement*, January 28th, 1928), and the Director for Ealing (*Education*, January 22nd, 1932, p. 114.)

Ibid, p. 71.

†M. Phillips: *Professional Courses in the Training of Teachers*. Part I. This *Journal*, Vol. I, Part 3, p. 231.

‡Ibid., pp. 72, 73.

evidence available. Several papers have appeared in American journals describing attempts to arrive at an estimate of the value of various factors in producing teaching success, but these did not include pre-college experience. I decided therefore to analyse the records of some 800 students who have passed through the training department at Aberystwyth, to see what light, if any, was to be had on this problem. On preliminary analysis, the position was not so simple as it appears at first sight. It is obviously unsatisfactory to compare the teaching assessments of the experienced and the inexperienced groups since these groups may not be strictly comparable. Intrinsic factors such as age, sex, academic ability, intelligence, social status and *savoir-vivre*, character qualities and so forth may be selected by the conditions of entry. The teaching experience, or the higher courses at the secondary school, without having any direct bearing upon the improvement of the teaching performance at the end of the professional year, may quite easily select types of candidate who would be successful or not, irrespective of the pre-college experience. For example, if the student teachers were all below the average in intelligence and academic ability, and the higher course candidates all above the average, then the latter might derive more benefit than the former from any experience, and might use the teaching practice which all students undergo in their professional year to such purpose as to mask the effects of the pre-college experience upon the student teachers. It might then be argued that the pre-college experience was valueless and produce apparently convincing statistics to prove it.

The investigation here reported deals with the records of 399 men and 362 women students admitted to the department from session 1922-23 to session 1929-30. The sample in each professional year includes the following types :

- (a) Four-year students admitted to the department in their first, second, or third academic years.
- (b) One-year post-graduate students.
- (c) A few reduced course students.

Any of these groups may contain both those having some pre-college experience as pupil teachers, student teachers, and uncertificated teachers ; and those with no such experience.

The measures available for analysis include :

- (a) Length and type of pre-college experience.
- (b) Teaching grade assessed after the second period of school practice in the professional year.
- (c) Age.

- (d) Academic record achieved.
- (e) Marks in the papers in theory, practice of education, and special methods of teaching taken at the end of the professional year. These papers are at the standard of a university diploma in education.
- (f) Marks obtained in a series of mental tests given to all the students available at the beginning of each professional year.*

An attempt has been made to estimate the effect of pre-college experience upon the teaching grade achieved by students in their professional year after allowing for the possible influence of age, academic ability, intelligence, and theoretical instruction. Further, the following points have been investigated :

- (a) What is the relative value of student teacher and uncertificated teacher experience.
- (b) What effect, if any, has the pre-college experience had upon
 - (i) The academic records of the students.
 - (ii) The scores in the theory of education papers set in the professional examinations at the end of the fourth year.
- (c) Are any of the factors normally available to the selection committees choosing candidates for admission, sufficiently closely related to the final teaching grade achieved, to be useful in predicting future teaching success.

The numbers dealt with are reasonably large, and the students have been drawn from a wide area, from all sorts of schools, both large urban and small rural types. They present, therefore, the results of experience gained in places representing average school conditions. The majority of the staff of the training department has remained unchanged over the whole of the time covered by the accumulated results, so that there has been a continuity of policy and a similarity of standards of assessment. For purposes of comparison some of the results of American investigators dealing with specially prepared data have been shown at the end of this paper. (See Appendix at end of Part II.)

II.—EFFECT OF PRE-COLLEGE EXPERIENCE ON TEACHING GRADE ACHIEVED BY STUDENTS IN THE PROFESSIONAL YEAR.

All students in the department are required to undergo periods of teaching practice during the professional year making a minimum of sixty days for inexperienced students and forty days for those who

* Mental tests had been given to students in the training department since 1921 by the late Mr. D. J. Saer in connection with his work on Bilingualism. His results are incorporated in the test material discussed later in this paper.

have had one year or more previous teaching experience in some recognized capacity. At the end of the practice period in the second term the students' teaching grade is assessed according to the series, 'A, B+, B, B—, C+, C, C—, D and E. The A grade is reserved for students who show outstanding qualities of personality, character, and teaching capacity. C is the mark given to the average, those who seem likely to become ordinarily satisfactory practitioners after leaving college. It is an open question how far these marks will be an accurate prediction of success in professional work. For one thing, teaching in schools is too often assessed by examination results rather than by any real professional standards, and it is quite possible that an A teacher who is really an artist at his work will react strongly against the examination grind that characterizes some schools. Still the grades achieved in the professional year are used widely as a basis for appointment, and our experience has been that in the long run, opinions of teaching capacity based upon the grades achieved in the professional year do serve as a guide to future capacity. The exact meaning to be given to any given teaching grade is difficult to define, but it includes personality traits, e.g., charm of manner, force of personality, sympathy with children, tact, quickness in the uptake; mental traits, e.g., clearness of thinking and exposition, system, alertness of mind, power of self criticism; and finally the command of the technique of teaching and class management. The following procedure is adopted in making the assessments: at the end of the second period of school practice each individual case is discussed by the supervisors and a mark suggested. In case of disagreement the points are weighed by a senior member of the staff who knows both the student and the supervisors. In this way a final order is prepared. The students are then sampled freely by inspectors of the Board of Education who test the assessments against their own standards. After this inspection the assessments are again discussed by staff and inspectors, and reports of heads of practising schools are considered in cases of doubt or disagreement. In this way the grade marks finally allotted are the results of the pooled observations of several experienced teachers, and they are not likely to be influenced unduly by any one personal bias or particular standard. The cases most difficult to agree upon are those which seem better than a C but not good enough for the full B grade. These are labelled C+ or B— as the balance of opinion seems to suggest. It is usually possible to decide that a given student is better than a C but not good enough for B; but exactly what intermediate position he should occupy may not be so clear. Hence in most of the results which follow these two grades C+ and B— have been pooled

and treated as one grade intermediate between B and C. Table I shows the number of students and the proportions of men and women in each grade.

TABLE I.

SHOWING THE NUMBER AND PERCENTAGE OF MEN AND WOMEN STUDENTS INCLUDED IN EACH TEACHING GRADE.

		Grade.							Total.
		A	B+	B	B- C+	C	C-	D	
Men. . . {	No. %	13 3	34 8.5	108 27	126 32	95 24	14 3.5	9 2	399
Women {	No. %	31 9	28 8	88 24	114 31.5	90 25	9 2.5	2 0.5	362
TOTAL . . {	No. %	44 6	62 8	196 26	240 31.5	185 24	23 3	11 1	761

It will be seen that the women have produced a greater proportion of A's and less proportion of D's. This may be due to differences of standard as between the men and women supervisors. However, the A's and the D's are usually tested carefully by the same inspectors who have an opportunity of comparing men and women students, and an experienced teacher who has supervised both men and women students is of the opinion that the standards in the two sections of the department are comparable. It is a matter of observation that the women show on the whole a greater conscientiousness and absorption in the work, and in addition a greater vivacity, lack of self-consciousness, tact, ready sympathy with children, particularly juniors, and these qualities tend to increase the attractiveness of the teacher's manner and stimulate the response of the class, which results tend to raise the assessment of teaching capacity. If the assessments are pooled we find the following :

		A, B+, B.	Below B.
Men {	No. %	155 39	244 61
Women {	No. %	147 41	215 59

showing that apart from the A grade there is a close approximation in the assessments.

To obtain a numerical measure for the teaching capacity of any given group the following arbitrary equivalents were adopted.

Grade ..	<i>A</i>	<i>B+</i>	<i>B</i>	<i>B--C+</i>	<i>C</i>	<i>C--</i>	<i>D</i>
Points ..	80	70	60	50	40	30	20

Pre-college teaching experience is taken to the nearest month.

The preliminary analysis revealed a number of students who had commenced as student teachers and had subsequently become uncertificated assistants. This complication made it somewhat awkward to arrive at a single scale of duration of experience for the purposes of constructing contingency and correlation tables. To pool the two types of experience another assumption was made that so far as effective experience and training were concerned one month of uncertificated assistants' experience was roughly equivalent to four months of student teachers' experience. All the pre-college experience was then calculated in units representing one month uncertificated assistants' service. This was found to separate the students into relatively homogeneous groups if the scale of the time shown in Table II is adopted. Groups with average service roughly equal to four, three, two, and one year as uncertificated assistants and one year as student teachers are obtained. The distribution gives two anomalous groups of twelve men and six women with two years of student teachers' experience only. In the tables these would appear in the same group as the one year uncertificated assistants, but as they were found to present certain peculiarities these two groups have been given separately.

TABLE II.

SHOWING THE CONSTITUTION OF THE GROUPS DISTRIBUTED IN TERMS OF MONTHS OF UNCERTIFICATED ASSISTANTS' EXPERIENCE.

NOTE.—One month uncertificated assistants' experience has been taken to be equivalent to four months student teachers' experience.

<i>Months of U.A. experience.</i>	<i>Men.</i>			<i>Women.</i>		
	<i>U.A. only.</i>	<i>Mixed U.A. and S.T.</i>	<i>S.T. only.</i>	<i>U.A. only.</i>	<i>Mixed U.A. and S.T.</i>	<i>S.T. only.</i>
More than 42·5 ..	2	2	—	—	—	—
29·5 to 42·5	3	1	—	1	—	—
18·5 to 29·5	6	2	—	3	1	—
5·5 to 18·5	24	28	12	7	6	6
0·5 to 5·5	2	1	109	—	—	94

Two methods of estimating the teaching capacity of a group have been used :

- (a) By taking the mean points earned by the group according to the scale of equivalents given on page 115.
- (b) By calling the A, B+, and B grades successes and calculating the proportion of successes in the group.

The numbers and the proportions of each grade, both men and women, contained in each range of pre-college experience are summarized in Tables III and IV, and shown graphically in Fig. 1 (p. 118). To test the statistical significance of these tables the chi-square test was applied. Substituting the values for chi-square in Fisher's Tables* gave P =much less than .01 (men), and .76 (women).

This means that in a random population the results shown are likely to arise by chance much less than once in a hundred trials in the case of men, and between seventy and eighty times in a hundred trials in the case of women. The coefficient of correlation between teaching grade and teaching experience was found to be :

$$r = .26 \pm .03 \text{ (men).}$$

$$= .05 \pm .04 \text{ (women).}$$

TABLE III.

SHOWING PERCENTAGES OF EACH TEACHING GRADE INCLUDED WITHIN DIFFERENT GROUPS OF PRE-COLLEGE EXPERIENCE.

	Pre-college experience.	No. of students.	Grade							Mean points.	Per cent of successes.
			A	B+	B	B+	C	C-	D		
Men ..	All U.A.'s 12 months	68	10	13	44	16	16	—	—	58.5	67
	U.A. 12 months	52	2	15	50	17	15	—	—	57.2	67
	S.T.	112	2	8	32	33	17	5	3	51.8	42
	Nil	207	2	7	20	35	30	4	3	49.4	29
	All men ..	399	3	9	27	32	24	4	2	51.6	39
Women	All U.A.'s 12 months	18	11	—	33	17	33	6	—	52.2	44
	U.A. 12 months	13	15	—	31	8	38	8	—	52.3	46
	S.T.	94	9	5	26	29	31	—	1	52.8	40
	Nil	244	9	9	24	33	22	3	1	53.8	42
	All women	362	9	8	24	31	25	2	1	53.4	41

* Statistical Methods for Research Workers, p. 96.

TABLE IV.

SHOWING TEACHING ACHIEVEMENT IN MEAN POINTS AND PERCENTAGE OF SUCCESSES OBTAINED, OF STUDENTS WITH DIFFERENT LENGTHS OF EXPERIENCE MEASURED IN MONTHS OF UNCERTIFICATED ASSISTANTS' SERVICE OR ITS EQUIVALENT.

<i>Months of U.A. experience.</i>	<i>Mean points.</i>				<i>Percentage of successes.</i>	
	<i>No.</i>	<i>Men.</i>	<i>No.</i>	<i>Women.</i>	<i>Men.</i>	<i>Women.</i>
42·5 —	4	65	—	—	75	—
29·5 to 42·5	4	67·5	} 5	} 52	75	} 40
18·5 to 29·5	8	60			62·5	
5·5 to 18·5	52	57·2	13	52·3	67	46
0·5 to 5·5	112	51·8	94	52·8	42	40
0·0 to 0·5	207	49·4	244	53·8	29	42
All U.A.'s	68	58·5	18	52·2	68	44
24 months S.T.'s	12	49·2	6	50	17	17
TOTAL	399	51·6	362	53·4	39	41

We have the rather curious result that the pre-college experience seems to produce a significant effect upon the teaching grade of the men, but no effect in the case of the women, taking the groups as a whole. The tables show that the effect is produced most powerfully in the case of the men with uncertificated assistants' experience. The mean points of the men student teachers are just significantly higher than the mean of the inexperienced group. From Table III we have :

12 months uncertificated assistants. Mean points= $57·2 \pm .83$

12 months student teachers. Mean points= $51·8 \pm .75$

Inexperienced. Mean points= $49·4 \pm .55$

giving differences of :

Uncertificated assistants—student teachers $= 5·4 \pm 1·11$

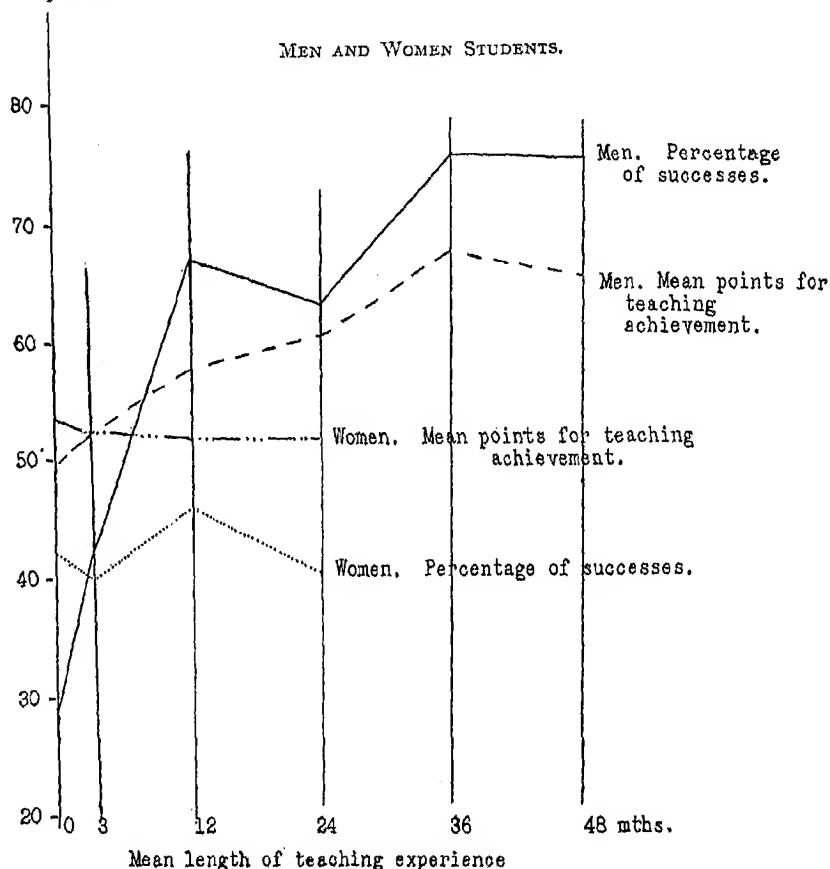
Uncertificated assistants—Inexperienced $= 7·8 \pm .98$

Student Teachers—inexperienced $= 2·4 \pm .74$

Amongst the men students a period up to twelve months of either uncertificated assistants' or student teachers' experience has produced little or no effect upon the proportion of A's. It causes a shift upwards into the B and B+ grades, *strongly marked in the uncertificated assistants' group*. Increase in the length of student teachers' experience beyond twelve months produced no appreciable effect upon the grade of the small group involved. The marked effect of the uncertificated assistants' experience is suggested by comparing the group of twelve student teachers having two years experience with another group of eight men

FIG. I.

Graphs showing the mean points for teaching achievement and percentage of teaching successes made by groups having a given mean length of teaching experience calculated in months of U.A. service or its equivalent.



who had two years student teachers' experience followed by twelve months uncertificated assistants' experience. The records of the two groups are given in the following table:

	Teaching grade.							Mean points.	Per cent successes.
	A	B+	B	B- C+	C	C-	D		
Two years S.T. ..	—	1	1	6	4	—	—	49.2	17
Two years S.T.+ 12 months U.A....	1	1	4	—	2	—	—	58.8	75

The distribution of the C— and D grades suggests that the uncertificated assistants' experience acts as an eliminating agency *while the student teachers' experience does not*. The one year student teachers produced almost as high a proportion of teaching failures as the inexperienced group. It would seem that in a number of cases the supervision of the student teachers, and the standard of work required of them, is not sufficiently severe to discover cases with little or no professional aptitude or promise; for it should be noted that in each case an applicant for admission must produce a report from the head of the school with whom the experience has been gained.*

The case of the women students is curious. It would seem that pre-college experience has no effect upon the teaching grade, whether calculated in mean points or proportion of successes. The result may be due partly to the small number of women uncertificated assistants. It cannot be supposed that the women are incapable of profiting by experience. The inexperienced women return a better average than either the inexperienced men or the men student teacher group. This seems to show that either the women start with a better inherent equipment for teaching, or that they get more benefit from the teaching practice in the professional year, or both. Possibly the women uncertificated assistants and student teachers' groups contain a selection of rather inferior students, or the women acquire too much from their pre-college experience. Direct observation of the men and women students suggests that the women as a whole group tend to be more serious in their application to the work in hand, and to enter into it more wholeheartedly and with more concentration than the men. These characteristics may be a factor in the apparent lack of improvement amongst the women who have had experience. The greater concentration and thoroughness of the women may render them more liable to acquire permanent professional habits of an unsatisfactory nature, making them less teachable later. On the other hand, the unwillingness or inability of the men to become too absorbed may render them less liable to influence by poor as well as good professional conditions.

Generally, we may conclude that whether by selection or direct influence, or both, pre-college experience, *particularly of the uncertificated assistant type, continued for a year or more*, does improve both the

* This bears out the finding of the Departmental Committee. On page 72 of the Report it is stated that "responsible witnesses told us that in large areas, London being one, the number of student teachers ever reported as unsatisfactory was practically negligible. We have also heard no evidence that leads us to suppose that any appreciable number of student teachers give up preparation for the profession at this stage because their experience convinces them of their unfitness."

general level of teaching achievement and the proportion of teaching successes in the case of the men students. The effect is most marked for the B+ and A grades in those men who have had eighteen months or more of uncertificated assistants service. Amongst the women students there is an apparent lack of effect. It seems most reasonable to suppose that the experienced groups of women contain some proportion of less able or less fortunate students, and in that case the pre-college experience may produce a positive improvement by bringing the general level of teaching achievement of these students up to a point at which it is comparable to that of the more favoured group.*

III.—RELATIVE INFLUENCE OF AGE, FACTORS MEASURED BY THE INTELLIGENCE TESTS, ACADEMIC ABILITY, AND THEORETICAL INSTRUCTION IN PROFESSIONAL SUBJECTS.

It may be suggested that the improvement in teaching grade noted in the men students may be due to other factors present, e.g., greater age in the uncertificated assistants' group, differences in intelligence, effects of academic ability, or of instruction in theory and methods of teaching given in lectures or got through books. An attempt has been made to find if these factors have any effect upon the teaching grade comparable to that of teaching experience.

(a) *Effect of age.*

There seems to be no greater relation between teaching achievement and age than would be accounted for by the fact that the students with longer experience are likely to be by that much older on entering college. Table V shows the average ages of the various teaching groups, and the averages of groups arranged according to the actual time spent in school service. It is found that the average age decreases with a decrease in the time spent in teaching, while the average age in the A, B+, B, etc., grades is practically constant. The age range of the inexperienced group is as great as that of the whole sample. A contingency table for relation between age and teaching grade in *students without previous experience* shows $P=.9$ (Fisher's Tables), that there is no more association between these factors than might be expected to arise by pure chance.

* It is stated in the Departmental Report that a serious objection to the student teacher preparation is the great strain that the year's work involves, especially for girls. . . . "many girls seemed stupefied with the exhausting work of the student teacher year . . . the suggestion is probably true that in many cases the less conscientious student teachers drift and get demoralised, while others try to do two things well (i.e., school work and academic studies) and get overworked." See page 73.

TABLE V.

SHOWING (a) AVERAGE AGE OF MEN IN THE A, B+, ETC., GROUPS, AND (b) AVERAGE AGE OF GROUPS OF MEN CLASSIFIED ACCORDING TO THE ACTUAL TIME THEY HAVE SPENT IN TEACHING BEFORE ENTERING COLLEGE.

<i>Teaching grade.</i>	<i>Average age.</i>	<i>Actual teaching experience in months.</i>	<i>Average age.</i>
A	25.4 years	18 and above.	25.5 years
B+	23.6 years	6 up to 18	24.3 years
B	23.8 years	3 up to 6	22.9 years
B—C+	23.0 years	Less than 3	23.3 years
C	23.4 years		
C—	22.3 years		
D	25.2 years		

(b) *Effect of the factors measured by the intelligence tests.*

In Tables VI and VII are shown the proportions of each teaching grade in given ranges of intelligence test score with teaching experience constant, and in given ranges of teaching experience with intelligence score constant. It appears that for a given range of experience little or no significant change in teaching grade accompanies change in intelligence score, while for a given range of intelligence score marked differences in teaching grade accompany differences in the type and length of pre-college experience. It will be seen that *the student teachers' experience is very much inferior in effect to the uncertificated assistants' experience, and little better than no experience at all.*

TABLE VI.

SHOWING RELATION BETWEEN SCORES ON INTELLIGENCE TESTS, AND TEACHING ACHIEVEMENT, IN GROUPS WITH THE SAME RANGE OF TEACHING EXPERIENCE.

MEN STUDENTS.

<i>Teaching experience.</i>	<i>Score in intelligence tests.</i>	<i>No. in group.</i>	<i>Per cent of A's.</i>	<i>Per cent of successes.</i>	<i>Mean points.</i>
More than 12 months U.A. {	115+	16	31	62	61.3
	85 to 114	14	7	64	58.5
	84—	5	—	80	58.0
6 to 12 months U.A. {	115+	8	13	75	61.3
	85 to 114	20	—	65	55.5
	84—	2	—	100	60
6 months and more S.T. {	115+	21	5	29	49
	85 to 114	68	1	42	51.5
	84—	23	—	30	50.5
Less than 6 months {	115+	45	2	29	49
	85 to 114	109	1	30	49.8
	84—	42	5	29	48.8

TABLE VII.

SHOWING RELATION BETWEEN TEACHING ACHIEVEMENT AND TEACHING EXPERIENCE IN GROUPS OF MEN WITH THE SAME RANGE OF SCORES ON INTELLIGENCE TESTS.

Score on intelligence tests.	Teaching experience in months	Per cent of A's.	Per cent of successes.	Mean points.
115+	Plus 12 U.A.	31	62	61.3
	6—12 U.A.	13	75	61.3
	6 and more S.T.	5	29	49.0
	Less than 6	2	29	49.0
114 to 85	Plus 12 U.A.	7	64	58.5
	6—12 U.A.	—	65	55.5
	6 and more S.T.	1	42	51.5
	Less than 6	1	30	49.8
84—	Plus 12 U.A.	—	80	58.0
	6—12 U.A.	—	100	60.0
	6 and more S.T.	—	30	50.5
	Less than 6	5	29	48.8

(c) *Effect of academic ability.*

Tables VIII and IX show that with teaching experience relatively constant, teaching achievement shows no tendency to vary with academic record, while with academic record constant the teaching achievement varies with the type of experience.

TABLE VIII.

SHOWING RELATION BETWEEN ACADEMIC RECORD AND TEACHING ACHIEVEMENT IN GROUPS OF MEN WITH THE SAME RANGE OF TEACHING EXPERIENCE.

Teaching experience.	Academic record.	No. in group.	Per cent of A's.	Per cent of successes.	Mean points.
More than 12 months U.A.	I to IIb hors.	12	25	58	60.0
	III hors. and pass.	16	6	63	55.6
	Fail	8	25	75	63.7
6 to 12 months U.A.	I to IIb hors.	14	—	72	59.3
	III hors. and pass	13	8	69	57.7
	Fail	6	17	84	60.0
6 and more months, S.T.	I to IIb hors.	41	—	39	53.0
	III hors. and pass	51	2	45	52.6
	Fail	25	—	20	43.4
Less than 6 months.	I to IIb hors.	115	1	29	49.8
	III hors. and pass	77	3	33	48.8
	Fail	21	5	29	49.0

TABLE IX.

SHOWING RELATION BETWEEN TEACHING EXPERIENCE AND TEACHING ACHIEVEMENT IN GROUPS OF MEN WITH THE SAME RANGE OF ACADEMIC RECORD.

<i>Academic record.</i>	<i>Teaching experience in months.</i>	<i>No. in group.</i>	<i>Per cent of A's.</i>	<i>Per cent of successes.</i>	<i>Mean points.</i>
I to IIb hons. ...	Plus 12 U.A.	12	25	58	60·0
	6 to 12 U.A.	14	—	72	59·3
	6 and more S.T. ...	41	—	39	53·0
	Less than 6	115	1	29	49·8
III hons. and pass	Plus 12 U.A.	16	6	63	55·6
	6 to 12 U.A.	13	8	69	57·7
	6 and more S.T. ...	51	2	45	52·6
	Less than 6	77	3	33	48·8
Fail	Plus 12 U.A.	8	25	75	63·7
	6 to 12 U.A.	6	17	84	60·0
	6 and more S.T. ...	25	—	20	43·4
	Less than 6	21	5	29	49·0

(d) *Effect of theoretical instruction as measured by the scores on the professional papers at the end of the professional year.*

Tables X and XI show that, as before with theory scores constant, experience has a marked effect upon the proportion of good teachers in a given group, but at the same time if experience is constant, the groups with the highest scores in theory tend to produce the highest proportion of good teachers. It may be that the good teachers produce good theory scores because the experience helps in the understanding of the theory, or the theoretical instruction tends to raise the teaching grade. The latter is not so likely, as observation shows that many of the students treat the theoretical studies as an academic exercise in book learning pure and simple; and, in addition, while the teaching grade is assessed at the end of the second term, the bulk of the work which is represented on the sessional papers in theory of education is done in the third term, particularly in the case of the men students to whom these tables refer. Evidence will be shown in more detail later which suggests that the two factors, teaching grade, and what is measured by the theory scores are correlated on account of their relation to a third group of factors.

TABLE X.

SHOWING TEACHING ACHIEVEMENT AND SCORES IN PROFESSIONAL THEORY PAPERS IN GROUPS OF MEN WITH THE SAME RANGE OF PRE-COLLEGE TEACHING EXPERIENCE.

<i>Teaching experience in months</i>	<i>Standardised scores on theory papers.</i>	<i>No. in group.</i>	<i>Per cent of A's.</i>	<i>Per cent of successes.</i>	<i>Mean points.</i>
Plus 12 U.A. ..	115+	8	63	87.5	71.2
	114 to 85	21	5	52	55.7
	84 -	4	—	50	50.0
6 to 12 U.A. ..	115+	2	50	100	70.0
	114 to 85	17	—	76	57.7
	84 -	3	—	66	53.3
6 and more S.T.	115+	14	7	64	60.7
	114 to 85	61	2	40	52.5
	84 -	19	—	42	49.0
Less than 6 ..	115+	29	—	24	51.4
	114 to 85	109	3	40	52.6
	84 -	39	—	13	43.3

TABLE XI.

SHOWING RELATION BETWEEN TEACHING EXPERIENCE AND TEACHING ACHIEVEMENT IN GROUPS OF MEN WITH THE SAME RANGE OF MARKS ON THE PROFESSIONAL THEORY PAPERS.

<i>Standardised scores on theory papers.</i>	<i>Teaching experience in months.</i>	<i>No. in group.</i>	<i>Per cent of A's.</i>	<i>Per cent of successes.</i>	<i>Mean points.</i>
115+	Plus 12 U.A.	8	63	87.5	71.2
	6 to 12 U.A.	2	50	100	70.0
	6 and more S.T. ..	14	7	64	60.7
	Less than 6	29	—	24	51.4
114 to 85	Plus 12 U.A.	21	5	53	55.7
	6 to 12 U.A.	17	—	76	57.7
	6 and more S.T. ..	61	2	40	52.5
	Less than 6	109	3	40	52.6
84 -	Plus 12 U.A.	4	—	50	50.0
	6 to 12 U.A.	3	—	66	53.3
	6 and more S.T. ..	19	—	42	49.7
	Less than 6	39	—	13	43.3

For the students as a whole the co-efficients of correlation relating to b, c, and d, above are :

	<i>Men.</i>	<i>Women.</i>
Between teaching grade and intelligence scores. . . .	$r = .03 \pm .04$	$r = .17 \pm .04$
Between teaching grade and academic record	$r = .09 \pm .03$	$r = .40 \pm .03$
Between teaching grade and average theory scores. .	$r = .33 \pm .03$	$r = .37 \pm .03$

IV.—SUMMARY OF RESULTS AND CONCLUSIONS. PART I.

(1) Pre-college teaching experience appears to be significantly connected with teaching grade achieved in the professional year, in the case of the men but not the women students.

(2) This connection is most strongly marked in men students who have had more than twelve months experience as uncertificated teachers. The type of experience is of more importance than the amount of it. Student teacher experience seems, on the whole, to be little better than no experience at all.

(3) Among the women students, the experienced groups, whether uncertificated or student teachers, do not show any significantly better results than the inexperienced groups. This is probably due to the fact that other influences mask the effects of experience ; women students may gain more value from the teaching practice in the professional year than from pre-college experience, and it is possible that they are more liable, through greater concentration in the work, to acquire bad as well as good technique from the experience before entering college.

(4) Within the limits of age here represented there is no connection between teaching achievement and age.

(5) In the men students there is no significant connection between academic record or the abilities measured by the intelligence tests and the teaching grade. The positive effects of pre-college experience noted cannot, therefore, be ascribed to these factors.

(6) With teaching experience constant there is a significant connection between success in the theory papers taken at the end of the professional year and teaching grade. The nature of this connection, and the extent to which pre-college experience contributes to the assimilation of theoretical instruction, will be discussed in Part II of this report.

RÉSUMÉ.

L'EXPÉRIENCE PROFESSIONNELLE AVANT L'ENTRÉE À L'ÉCOLE NORMALE, ET D'AUTRES FACTEURS CONTRIBUANT AU SUCCÈS PROFESSIONNEL DES ÉTUDIANTS D'UNIVERSITÉ.

Il existe une différence d'opinion quant à la valeur de l'expérience gagnée par les jeunes gens et les jeunes filles avant l'entrée à l'école Normale. On prétend d'un côté qu'elle augmente leur aptitude pour l'enseignement, qu'elle les aide à assimiler l'instruction théorique professionnelle, et qu'elle élimine les incapables. De l'autre côté on nie tous ces avantages. Cette enquête est une tentative d'obtenir de l'évidence concrète sur ce problème en analysant la carrière de 761 étudiants d'université.

Dans ce groupe d'étudiants on trouve que le service total et responsable pendant une année, ou plus, a vraiment une influence positive sur la note obtenue dans l'épreuve pratique, dans le cas des hommes, mais non pas dans celui des femmes. L'expérience gagnée comme " élève-professeur " n'a pas de valeur, on n'en a que très peu. Chez les hommes, où l'on a remarqué cette influence, l'âge, la carrière académique, et les aptitudes, mesurées par un " test " d'intelligence, ne montrent aucun rapport significatif avec la note obtenue.

On a trouvé, cependant, un rapport significatif chez tous les étudiants, hommes et femmes, entre la note obtenue dans l'épreuve pratique, et le succès dans l'examen de théorie professionnelle.

ÜBERSICHT.

LEHRERFAHRUNG VOR ZUTRITT ZU EINER LEHRERBILDUNGSANSTALT UND ANDERE FAKTOREN BEIM ERFOLGREICHEN UNTERRICHTGEBEN VON UNIVERSITÄTSSTUDENTEN.

Es besteht ein Meinungsunterschied über den Wert der von jungen Menschen vor Zulassung zu einem Institut für Pädagogik gewonnenen Lehrerfahrung. Diese soll ihre Lehrfähigkeit erhöhen, dazu beitragen, theoretischen Berufsunterricht in Einklang mit der Praxis bringen, und die Unfähigen beiseitesetzen. Andererseits werden diese Vorteile in Abrede gestellt. Hier wird ein Versuch gemacht, konkrete Beweise über dieses Problem durch Analyse der Leistungen von 761 Universitätsstudenten zu ermitteln.

Es stellt sich bei dieser Gruppe von Studenten heraus, dass verantwortliche Dauerlehrtätigkeit auf ein Jahr oder länger auf den von männlichen aber nicht von weiblichen Studenten erhaltenen Rang positiv wirkt. Die Erfahrung des Lehramtsaspiranten bleibt fast ohne Wirkung. Im Falle der Männer, wo die Wirkung in Betracht gezogen wird, zeigen Alter, akademische Leistungen, und die von einer Intelligenzprüfung gemessenen Fähigkeiten keinen bedeutenden Zusammenhang mit der Stufe der Lehrfähigkeit. Ein bedeutender Zusammenhang zeigt sich bei sowohl männlichen als weiblichen Studenten zwischen der Stufe der Lehrfähigkeit und Erfolg in den berufstheoretischen Prüfungen.

(Part II will appear in the next number.)

A BORSTAL EXPERIMENT IN VOCATIONAL GUIDANCE.*

By ALEC RODGER

(from the *National Institute of Industrial Psychology*).

- I.—*The general aim of the Borstal system.*
- II.—*The particular aim of this experiment.*
- III.—*The tests employed.*
- IV.—*The assessment of "temperamental qualities."*
- V.—*The interview procedure.*
- VI.—*The making of recommendations.*
- VII.—*Problem cases.*
- VIII.—*Tentative conclusions.*

I.—THE GENERAL AIM OF THE BORSTAL SYSTEM.

It is truly shocking to contemplate the fact that less than a hundred years ago—in 1833, to be exact—an English boy of only nine years of age was sentenced to death on an ordinary charge of housebreaking. By that time, however, our great-grandfathers were beginning to recognize the error of their penal ways, and the last century has seen a gradual but quite marked change in the attitude of society (as represented by its laws) towards the young offender.

The change has resulted very largely from the development of a better understanding of the causes of crime. The time-honoured notion that a criminal act is due entirely to an entity called "an evil will" has given way to a succession of more up-to-date views on the matter, each one more scientific than the last. We now realize that crimes may be regarded as symptoms of internal conflicts, and that, consequently, our efforts to treat crime should consist primarily of efforts to resolve those conflicts and to give a new direction to the forces which are involved in them. Our aim should be to reform, to re-shape, the offender in a positive fashion, and not simply to seek revenge or to deter him from further wrong-doing by methods which are essentially negative in their effect.

This reformatory view is not yet by any means generally accepted, but it is steadily gaining ground. One of its first important advances in England was made nearly thirty years ago, when an experimental

* A paper read before the Education Section of the British Psychological Society on October 3rd, 1932.

institution was opened in the village of Borstal, near Rochester. Workshops were set up in a converted convict prison, and a definite attempt was made to teach a selected band of young delinquents something which would be of real use to them when, eventually, they regained their freedom.

The experiment was acclaimed to be a success, and with the passing of the Borstal Act of 1908 the Borstal system proper came into being. It sought to reform by inculcating what were called "habits of industry, self-respect and self-control." The boys—who were to be detained, normally, for three years, and who were to be between the ages of sixteen and twenty-one at the date of conviction—were to have their games as well as their work; and they were to have a carefully-planned scheme of rewards and privileges.

At the present time there are six Borstal Institutions for boys—one at Borstal itself, one at Feltham in Middlesex, one at Portland, one on the Isle of Wight, and two in Nottinghamshire. Each is divided up into houses, after the manner of a public school, and each house has its house-master and his assistant. Attached to the institutions, too, are medical officers, matrons, chaplains, discipline officers, and instructors. The officials are usually fairly numerous. At Portland, for example, there is a staff of over a hundred for a total of about four hundred and fifty boys.

The whole system is a very flexible one, and it has changed in many respects since its initiation, but the working-parties have always been among its essential and most prominent features. Instruction is given in joinery, in smithing, in plumbing, in bricklaying, in cooking, in gardening, and in a number of other occupations. There are also, inevitably, a few unskilled labouring parties. It is not pretended, of course, that the vocational training provided is in any sense of the word complete. That would be an aim obviously impossible of achievement in the short time available. But it can be claimed that it is frequently an adequate preparation for advanced work.

We have no accurate knowledge of the methods employed in the early days of the institutions in the allocation of boys to their working-parties; but in the more immediate past, although nominally the task has been performed by the housemasters, it has usually been left to the boys themselves to choose. They have been allowed to select an occupation in which they have professed an "interest." But there has lain a danger.

Other things being equal, a person who is interested in an occupation is likely to be more satisfied with it, and satisfactory in it, than a person who has not that interest. But interest is not the only factor which determines occupational satisfaction and satisfactoriness. Ability must

also play its part. And neither necessarily involves the other. It is true that they frequently "go together"; but they do not always do so. A boy may fail ignominiously at a mechanical trade because in spite of his intense interest in things mechanical he has little aptitude for dealing with them; or he may fail because in spite of his aptitude for dealing with them he shows no consistent interest in them. Interest must be accompanied by ability if success is to be predicted with any degree of confidence. Interest alone does not provide us with a sufficient basis for optimism. We must be on our guard against any inclination to choose a course of action simply because we are interested in it. There may be some substantial justification for our tendency to pursue it; but, on the other hand, there may not.

Many of those Borstal boys who have selected their own working-parties have done extremely well in them; more have done less well; others have done badly. Some of the failures have been due mainly to the fact that interest in an occupation has not been accompanied by any aptitude for it; some have been due mainly to the fact that the interest has been of an impermanent kind, grounded, maybe, upon a misunderstanding, or lack of understanding, concerning the nature of the work involved. All of the failures, no matter what their causes have been, have produced dismay—not only in the housemasters, who realize that they tend to sow the seeds of discontent, but also in Home Office officials, who, not without reason, dislike the waste of time and materials which such failures imply.

II.—THE PARTICULAR AIM OF THIS EXPERIMENT.

A few years ago the Prison Commissioners approached the National Institute of Industrial Psychology, through the Industrial Fatigue (now Health) Research Board, with regard to the possibility of applying to the problem the methods which the Institute had already shown to be of value in the giving of vocational guidance to boys and girls of school-leaving age. A short preliminary experiment produced excellent results. As the 1930 Report of the Prison Commissioners remarked, "none of the lads who were selected for work parties on the results of the tests applied for transfer to another party." It was decided, therefore, that a larger experiment should be undertaken.

It was arranged that during the course of one year—roughly, the whole of 1930—four hundred boys should be examined by the Institute. They were to be seen at the Wormwood Scrubs Boys' Prison, the collecting-centre for all the Borstal Institutions, before starting their training. And

in order that the comparative merits of the old and new methods might be assessed with a fair degree of accuracy it was agreed that half of the four hundred should form a "control" group. That meant that although the whole four hundred were to have the complete examination, vocational recommendations were only to be forwarded to the institutions for every alternate boy. For the rest no recommendations were to be sent, nor were any test results to be disclosed; they were to be allocated to their parties according to the system which had been employed in the past.

For the sake of uniformity of method the work of vocational guidance was carried out by one examiner, but the task of organizing the experiment was entirely in the hands of the Principal of the National Institute and of the Head of its Vocational Guidance Department.

The procedure adopted was a modification of that used at the National Institute itself in the examination of ordinary public and secondary school boys. Before the actual testing of each boy was begun the examiner made a brief study of his history. The police records, together with the comments of prison governors, medical officers, chaplains, lady visitors, probation officers and others, usually provided him with an adequate working knowledge of the boy, and notes were made (on a specially-prepared form) on what appeared to be important points.

During these preliminaries a number of boys were weeded out as being unsuitable for inclusion in the experiment. Most of these were youths of a very low degree of intelligence. They do not ordinarily present any serious vocational problem as far as Borstal is concerned, because they are for the most part unfit for skilled work of any kind and have no alternative but to do labouring in one form or another. It was possible to omit these boys altogether by making use of the scores they obtained in the intelligence test (Dr. Ballard's Columbian Test) which is given to all would-be Borstalians soon after their arrival at the Boys' Prison, and also by referring to the results of the Binet-Simon tests which are given by the prison medical officers to those who are suspected of feeble-mindedness. The other boys who were deliberately omitted were those who, by reason of some physical defect, were recommended by a medical officer as being unfit for any but sedentary work. It is a recognized practice at the institutions that offenders of this type should be put into either the tailoring party or the boot-shop.

The room used throughout the year was virtually a double cell. In many respects it was not an ideal one for the purpose—during the greater part of most days, for example, a choice had to be made between working without adequate ventilation and working to the accompaniment of disturbing noises from the yard outside the two small windows—but the prison authorities did everything they could to give assistance.

III.—THE TESTS EMPLOYED.

Several of the tests were given in group form to half a dozen boys at a time ; others were given individually. The whole examination, however, was always preceded by a short and very simple group explanation of its why and wherefore.

The first test was a paper-and-pencil one (the N.I.I.P. Form Relations Test) devised to measure an individual's ability to judge shapes and sizes—an ability which is obviously of great importance in most skilled manual occupations. This was followed by one (the N.I.I.P. Memory for Designs Test) which calls not only for the ability to judge shapes and sizes but also for the ability to reproduce them. The third was a paper-and-pencil test of intelligence (a revised version of the N.I.I.P. Group Test 34) of the type with which most educationists are familiar. These three were all given in group form and occupied the first hour of the examination.

After a brief rest a revised form of the Stenquist Assembly Test for mechanical ability was gone through. It consists in the putting together of the parts of ten fairly common mechanical objects—a bicycle bell, a lock, a piece of chain, and so on. The time-limit is thirty minutes, and the objects may be assembled in any order and, wherever necessary, with the help of a screwdriver. It need hardly be added that in this test, as in all the others, the method of scoring is rigidly standardized.

Following upon this—though usually several hours later—came one of Dr. J. W. Cox's N.I.I.P. group tests for manual dexterity ; that is, for speed and accuracy in the performance of certain finger and wrist movements. Each boy had in front of him ten pieces each of the four parts of an electric lampholder. These had first to be assembled and then to be taken to pieces as speedily as possible. The number of seconds required for each operation was carefully noted and attention was paid to the methods employed. The two processes—assembling and stripping—were repeated five times, so that when he had finished the test each boy had put together and taken to pieces fifty lampholders. The final score was based upon the two best scores for assembling and the two best for stripping. The element of competition was always prominent in this test and was obviously largely responsible for the fact that it was more popular than any of the others. Some youths became remarkably hilarious and excited about it.

Individual performance tests were given to every boy. The tests used were those known as Healy "A," Cube Construction, and the Dearborn Formboard. Unlike the paper-and-pencil tests, they all present practical planning problems. Until recently tests of this kind were commonly referred to as "performance tests of intelligence," but

it is apparent that the name is a somewhat misleading one. Intelligence is undoubtedly an important factor in the successful execution of them, but it would seem that a number of special abilities have their part to play as well. We would be wise, perhaps, just to regard them rather vaguely as tests of "practical ability."

The Healy "A" Test consists in the fitting together of five small rectangular pieces of wood into a larger rectangular frame. The score is based upon the number of seconds occupied in solving the problem. The Cube Construction Test is in three parts. In each the subject is provided with bricks, partly painted and partly unpainted, and is asked to build them up after the pattern supplied by a model which is shown to him.* The final score is based both upon the time taken and upon the number of moves required to complete each part of the test. The Dearborn Formboard test is also in three parts, and the scoring follows the same general plan.

All of these tests were used throughout the whole experiment. Two others—one of Dr. J. W. Cox's paper-and-pencil tests for mechanical ability, and Dr. W. J. Pinard's Perseveration Test—were used for a short period and then discontinued; the former because it proved to be too difficult for most of the boys, and the latter because it was found that there was not sufficient time available for the giving and scoring of it. Sometimes a more advanced intelligence test (the N.I.I.P. Group Test 33) was employed, but this was never done unless the boy concerned had first scored a very high mark in the ordinary intelligence test. Occasionally, too, a test (the N.I.I.P. Group Test 25) for routine clerical operations—such as classifying, filing, checking, copying, and simple arithmetical computation—was used to supplement the others.

IV.—THE ASSESSMENT OF TEMPERAMENTAL QUALITIES.

Test results, however, do not in themselves form an adequate basis for the giving of vocational guidance. They are of great value,

* An interesting apparent perseveration factor frequently influences the score obtained in this test. (Perseveration has been described as the tendency which every idea has, after having once occurred, to remount into consciousness spontaneously.) The first two models to be imitated are each blocks composed of nine small cubes set three by three. The third is a *cube* composed of eight small cubes set two by two by two. The small cubes are, throughout the test, identical in size. What is apparently a perseveration factor shows itself in the subject's tendency to build up the third model in three by three formation, as he has done in the two previous models, instead of in twos, as he ought. Of 100 Borstal boys examined consecutively, 51 manifested this inclination. Nine of them had placed all of the eight cubes on the table before discovering the mistake, and two of the nine actually said, "Please, sir, there's one missing." This happened in spite of the fact that in every case the model to be imitated was standing on the table in front of the subject and was never more than six inches away from the model being constructed.

undoubtedly, but the experienced psychologist is acutely conscious of their limitations. For a boy has many characteristics which may be of fundamental importance in his work but which cannot yet be measured by means of tests. A quick temper, for example, may be a tremendous handicap to him even though he possesses outstanding intellectual ability. Again, the capacity for mixing easily with people of very different qualities may play a considerable part in determining success. Pushfulness is still another of the many factors which may make or mar a man vocationally.

It would be rash and unscientific to say dogmatically that we shall never have valid and reliable tests for such characteristics as these ; but in spite of the efforts which have been made by hundreds of psychologists we certainly cannot claim to have them yet. But the absence of numerically-scored tests for these " temperamental qualities "—as they are sometimes called—does not absolve us from the task of doing our best to assess them by some other means. The ordinary N.I.I.P. procedure is to decide beforehand which of these qualities are usually of primary vocational significance, and then to study carefully the subject's history and his demeanour during the whole of the examination—and particularly during the more practical tests—with a view to discovering if, and to what extent, he does or does not possess the characteristics in question. The results of the study are recorded in five-point rating-scale form : that is, his possession of each of the qualities is rated as being very high, high, average, low, or very low.

Among the qualities assessed in this way were sociability, cheerfulness, assertiveness, energy, and perseverance. The difficulties presented by the procedure are frequently comic and need to be experienced to be appreciated to the full. To define satisfactorily the terms employed would be in itself the work of almost a lifetime. But in spite of these difficulties it is a method which makes for uniformity and which deserves to be widely used. It is obvious, of course, that the ratings will in many instances require to be annotated. For example, if a boy is rated " very high " for assertiveness it is desirable that a note should be added stating whether that assertiveness appears to be of a natural and straightforward kind or whether it appears to be (as it often is) a compensation for some deeply-rooted feeling of inferiority.

V.—THE INTERVIEW PROCEDURE.

A great deal of assistance in the making of these ratings was afforded by the carefully organized interview which each boy had after he had completed the tests. In it he gave his *own* version of his life-history.

He was encouraged to talk about his home, his parents, his friends, his school, his leisure activities, and his work. Particular attention was paid to his work. He was asked what jobs he had had in the past, how he had got them, why he had got them, what exactly he had had to do, how long he had kept them, what his wages had been, how he had got on with his employers and fellow-employees, and—last but not least—why he had left.

Downright lies were far less frequent than interesting exaggerations. One youth, who said he was "a trained bricklayer and a member of the bricklayers' union," later admitted that the only connection he had ever had with the trade had been as a tea-boy: moreover, he had been sacked from that position for incompetence at the end of his first fortnight. Another, who had stated that he was a farmer, confessed, "I've never actually been *on* a farm, but for a bit I had a milk round twice a day in a fair-sized town." A third, a particularly unimpressive specimen both socially and intellectually, claimed to have been on the stage. His statement was literally true, but it was made in such a manner as to obscure the fact that his only theatrical appearance had been as a wave under the carpet in a provincial production of "Robinson Crusoe"!

Stories of this kind were received by the examiner without any apparent disapproval. To some extent, in fact, they were encouraged, because they sometimes provided useful indications of important factors in the make-up of those who told them. But the encouragement was not overdone. When the exaggerations showed signs of exceeding unduly the (usually) more accurate history contained in the official records the topic of conversation was gently, but quite firmly, changed.

Part of the interview consisted in the discussion of the Borstal working-parties. Note was taken of each boy's apparent attraction to, or aversion from, the various occupations mentioned. It was obviously necessary, however, that these expressed likes and dislikes should be regarded with caution, for frequently they were based upon inadequate knowledge. More than one boy who said he was interested in fitting was found to be without the ghost of a notion as to what a fitter did beyond the fact that he was "a sort of mechanic." Opportunity was given, too, for the mention of any proposals a boy might have concerning the work he might be able to take up on his release.

The attitude of the youths towards the experiment could hardly have been more satisfactory. The vast majority of them gave their co-operation far more willingly than had been expected. A very few began their examinations in a spirit of civil disobedience, but without exception they gave in—without pressure—after the second or third test. Only one

boy out of the four hundred gave any indication of active defiance. During the first test he put his pencil down and said, "I don't see the good of all this." He was sent out of the room immediately, but later in the same day he asked if he might be allowed to carry on. For most of them the examination was a welcome respite from the daily routine of the Boys' Prison.

VI.—THE MAKING OF RECOMMENDATIONS.

The tests and interview at an end, the examiner had to face the problem of making vocational recommendations. In some instances he did not find it a difficult one. Diagram 1 shows the "psychographic profiles" of two youths who, because of their lack of intelligence, their lack of ability to judge shapes and sizes, their lack of mechanical ability, and their lack of manual dexterity, were unfit for skilled work of any kind. They were, however, sociable and cheerful individuals, each with a high average degree of perseverance. They had both been labourers before they had been convicted, and back to labouring they had to go. They went contentedly, for neither had hitched his waggon to any remoter star.

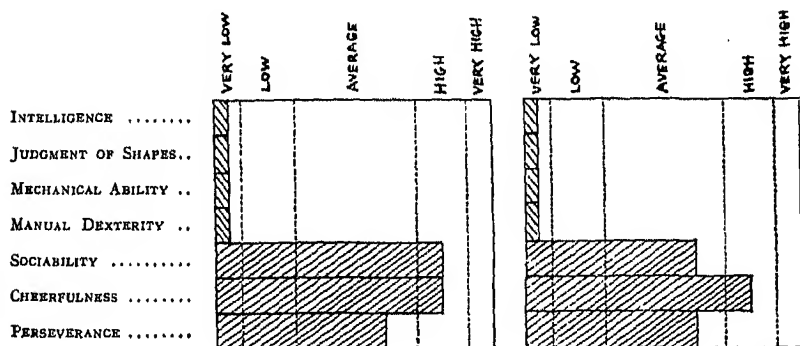


DIAGRAM 1.—TWO LABOURERS.

Three points should be noted in connection with the diagrams. In the first place, the seven characteristics mentioned are not the only ones of which cognizance was taken; but they are, perhaps, among those of most general importance. Secondly, numerically-scored tests were only given for the first four of the seven. Assessments of the remaining three are shaded differently in order to emphasize the fact that they are based upon the examiner's own judgment and not upon any definite test scores.

Thirdly, it must be remembered that the profiles are not intended to represent the *ideal* make-up of labourers and fitters: they represent the *actual* make-up of two boys who became labourers and of two boys who became fitters.

Diagram 2 shows the profiles of two would-be fitters. A Borstal fitting party should be composed of youths who are capable of performing satisfactorily mechanical work of a skilled kind. The work is done in an atmosphere which is akin to that of a Sheffield factory, and most of it consists in the turning out of products—such as door-hinges—for Government contracts. Mechanical ability is obviously a factor which makes for success in it, and so is manual dexterity. A fitter must have, too, the ability to judge quickly and accurately the shapes and sizes of the materials with which he is dealing, and he must be at least averagely intelligent. Both of these boys conform roughly to the requirements. It

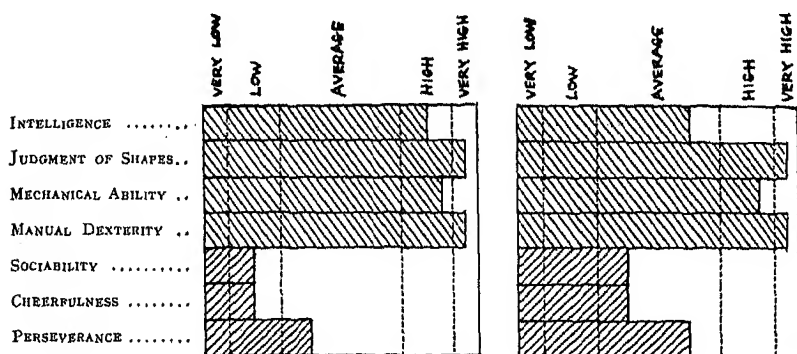


DIAGRAM 2.—TWO FITTERS.

will be noticed that neither of them was judged to be very sociable. Probably, however, this tendency to unsociability is to be accounted a gain rather than a loss. The noise and lay-out of a fitter's shop are not conducive to easy "mixing," and an unsociable boy is likely to find his enforced solitariness less irksome than one who is all the time anxious to gossip with his neighbour.

Similar principles were employed in deciding on fitness for other occupations—for joinery, bricklaying, plumbing, cooking, gardening and the rest. An attempt was made to see that boys whose fingers were "all thumbs" should not be made into plumbers, that boys of really good all-round abilities should not be left to run to seed in labouring parties, and that dirty boys should not be made into cooks.

VII.—PROBLEM CASES.

In many cases, however, the examiner experienced considerable difficulty in making his final decisions. The hindrances were of diverse kinds. In a few instances—but only in a few—the trouble arose from the fact that the individual was not really in a fit state for psychological testing. Many of these boys, it must be realized, had recently left home for the first time in their lives, and some of them had to go through their examination before they had succeeded, to any appreciable extent, in making an adequate adaptation to their new surroundings. In one or two cases the maladjustment was more deeply-rooted. One youth, whose homosexual tendencies had led him into trouble, was obviously so acutely miserable that his test results could only be regarded as being almost valueless.

A number of the examiner's difficulties arose from the fact that the interests and abilities of some of the boys were such that no ideal solution of their vocational problems could be found in any of the Borstal working-parties. The system caters primarily for youths who are most suitable for work of a manual kind: those whose capacities are in the main intellectual or social—as, for instance, clerks and salesmen—have to be content with a second-best. The reason for this lies, of course, in the fact that most Borstal boys come from families in which the general circumstances and occupational tradition are such that their members "take up" manual work without giving a thought to a job of any other kind.

A, for example, who was sixteen and a half at the time of his examination, came from an industrial town. His mother died when he was four: his father deserted him a few months later. He passed eventually into the care of a somewhat dissolute uncle who lived in a particularly dirty attic. He was not allowed to avail himself of a junior county scholarship which he won at the age of eleven: he was warned that when he was fourteen he would have to get out into the world and earn his own living. This he did: or, rather, this he began to do; for after three weeks spent as a warehouseman's assistant he was thrown out of work through trade depression. During the long period of unemployment which followed he worked hard writing essays and making financial calculations. He had an almost incredible knowledge of Stock Exchange news and of politics. By 1930, long before Sir John Simon and Mr. Walter Runciman had declared in favour of tariffs, he had become a Liberal Protectionist, and he had prepared schemes for dealing with unemployment, with India, with disarmament, and with most of the other problems which harass modern politicians.

He recognized the fact that his interests were very different from those of the people amongst whom he moved, and that his abilities were greater than theirs, and he began to cultivate an attitude of aloofness and superiority. He despised those whose capacities compared very unfavourably with his own. Finally he decided to break away, and in an attempt to escape from his uncle he stole. He was caught and put on probation. But again he stole. And again he was caught. On this occasion a Borstal training was recommended for him. Before he arrived at the institution to which he was sent he wrote an essay for the governor of the prison in which he was temporarily lodged. It was called, "A Boy's First Impressions of Prison Life." In it he pointed out how many of the little hard edges which the boys knocked up against on their first day in prison could quite well be rubbed off without impairing the discipline of the place in any way.

His practical abilities are good, but his main asset is undoubtedly his general intellectual ability. He scored exceptionally high marks in several intelligence tests. In the most difficult one of all (the N.I.I.P. Group Test 33) his result was well up to the standard usually attained by second-class honours graduates. Socially he is very unimpressive. He is short and rather frail-looking, and both his hair and his nose appear to be uncontrollable. He is excitable and somewhat contemptuous in his manner. Some of his characteristics are, in fact, of a kind which would not be of much positive use to him in any occupation, but he is definitely more suitable for work of an advanced clerical nature than he is for any of the Borstal working-parties. For the present, however, he will have to be content to be a small round peg in a rather large elliptical hole. He has become a carpenter. His instructor reports that although he is easy to handle and puts his best into the work his enthusiasm for it is not marked.

B, another "problem" case, was twenty years of age. He wanted to become a fitter at Borstal in order that he might later realize his ambition to join the Air Force as a mechanic. Unfortunately, although his intelligence is above the average, he has little mechanical ability and even less manual dexterity. His score in the test for manual dexterity was, in fact, one of the lowest recorded. His principal assets are, without a doubt, his social qualities. His personal appearance is greatly in his favour; he is tall and fresh-complexioned, his hair is dark and curly, his eyelashes are long and drooping, and he has a gold tooth in exactly the right place. His fondness for mixing with people is exceeded only by the success with which he does it. Sensitiveness and responsiveness are among his most outstanding characteristics.

When he left his elementary school he entered—more by accident than by design—an occupation in which those qualities could be exploited to the full: he became a salesman. He worked on a commission basis in his father's "soft goods" business, and even at the early age of sixteen and a half he sometimes earned as much as fifteen pounds in one week. He had in him, however, a streak of adventurousness which called for expression. He contrived to give it an outlet by becoming a continental buyer for the firm, for since leaving school he had attended evening classes and had managed to pick up a working knowledge of both French and German. But after a time felt that something still more novel was essential for his well-being; so he joined the Foreign Legion. There he remained for nearly a year. His removal from that regiment—which was effected at his own earnest (almost desperate) wish—involved his parents in considerable expense, but he did not appear to be particularly grateful for their assistance. Shortly after his return to England he was convicted of housebreaking and sent to Borstal.

His desire to become a fitter was, as has already been remarked, an unfortunate one. The test results showed clearly that he was quite unsuitable for any skilled work of a mechanical kind. On the other hand, he was obviously well-equipped for work which called primarily for the possession of good social qualities. But there is no occupation of that type at Borstal. It was apparent that he would have to be content with a second-best until the time of his release. On his travels he had acquired an unusually interesting and fairly extensive knowledge of continental cooking, and his conversation showed that he was well acquainted with some of the better Soho restaurants. For this reason, amongst others, it was suggested that he should become a cook. He laughed scornfully at the proposal and declared that although he liked eating things he disliked intensely the thought of having to cook them. He added that he would run away from his institution if he were not allowed to join the fitter's party. However, he became a cook, and the writers of his reports agreed that he was an interested and industrious worker who "gave of his best."

The two youths, A and B, are typical of those whose inadequate adaptation to the industrial conditions of the Borstal Institutions results largely from the fact that at present there is little scope for the vocational development of boys whose abilities are mainly intellectual or social rather than practical. Both of them did manage to make successful adjustments, but their adjustments would probably have been even more successful if it had been possible to provide them with work which made greater demands upon their principal capacities.

VIII.—TENTATIVE CONCLUSIONS.

A final assessment of the value of the National Institute's experiment cannot be made until the last boy examined has completed his training and has been discharged from his institution ; but the six-monthly reports which have already been received from housemasters indicate that that value cannot be questioned. Further modifications in the procedure will probably have to be made if the method is to be continued, but its essential worth—both from the point of view of the Borstal boy himself and from the point of view of the Home Office—is undeniable.

Not the least of the benefits which would result from the whole-hearted acceptance of the help which the vocational psychologist can give would be the increased general contentment of the boys. A person who is vocationally maladjusted tends not only to be vocationally discontented but also to be generally discontented ; and, conversely, a person who is vocationally adjusted tends not only to be vocationally contented but also to be generally contented. And the greater the Borstal boy's general contentment the more open he is likely to be to the non-vocational influences which the system attempts to foster.

It is obvious, of course, that the giving of vocational guidance should be, ideally, team-work. The vocational psychologist cannot perform his task adequately without the co-operation of others. It is particularly important that he should have the assistance of the medical psychologist. Both are psychologists, but each is a specialist, and neither can solve single-handed all of the many difficult psychological problems which most delinquents present. The medical psychologist's equipment is usually incomplete in that he has neither the vocational psychologist's knowledge of occupational requirements nor his experience of test administration : the vocational psychologist's equipment is usually incomplete in that he has neither the medical psychologist's knowledge of the many physical disorders which have important psychological aspects nor his experience of the subtler forms of psychological disturbance.

Granted this co-operation, it is clear that in the future the vocational psychologist in the penal institution will have a considerable part to play in the treatment of crime. It is equally clear that the vocational psychologist in the school will have a considerable part to play in its prevention.

RÉSUMÉ.UNE EXPÉRIENCE À BORSTAL DANS L'ORIENTATION
PROFESSIONNELLE.

Le but général des Instituts "Borstals" en Angleterre c'est d'offrir aux délinquants adolescents une éducation réformatrice. On donne de l'enseignement dans différentes occupations manuelles, spécialistes ou non-spécialistes. Jusqu'ici on a permis aux garçons de choisir leur groupe de travail, mais on a trouvé que ceci a souvent eu pour résultat de mal placer les enfants. L'Institut National de Psychologie Industrielle vient d'appliquer au problème ses propres méthodes, et on a fait passer des tests d'intelligence, de dextérité manuelle, de capacité mécanique et d'autres à 400 jeunes détenus. On a consacré une attention toute spéciale à la tâche importante d'estimer les qualités de tempérament. Quelques uns des cas les plus difficiles qu'on a rencontrés, étaient ceux où les aptitudes d'un garçon se trouvaient être en premier lieu intellectuelles ou sociales, plutôt que pratiques, puisque tout l'enseignement offert par les instituts est de nature pratique. Les résultats définitifs ne sont pas encore disponibles mais des rapports déjà reçus il est évident que l'orientation professionnelle psychologique pourra avoir à l'avenir un rôle important à jouer quand il s'agit d'empêcher, ou de traiter, le crime.

ÜBERSICHT.

EIN "BORSTALVERSUCH" ZUR BERUFSWAHL.

Die Borstalinstitute Englands sollen hauptsächlich jugendlichen Missetätern eine sie bessernde Erziehung geben. Unterricht wird in einer Anzahl von gelernten und ungelernten Handwerken gegeben. Bisher durften die Knaben in der Regel ihre eignen Arbeitsgruppen wählen, aber man hat die Erfahrung gemacht, dass dadurch häufige Fehlgriffe entstanden. Das Nationale Institut für Industrielle Psychologie hat kürzlich seine eignen Methoden auf das Problem angewendet, und 400 Jugendliche sind auf Intelligenz, Fingerfertigkeit und mechanische und sonstige Fähigkeiten geprüft worden. Man hat besondere Aufmerksamkeit der wichtigen Arbeit gewidmet, durch das Temperament bedingte Eigenschaften abzuschätzen. Einige der schwierigsten von den gefundenen Fällen waren die, in denen man erfuhr, dass die Fähigkeiten der Knaben in erster Linie intellektuell oder sozial und nicht praktisch gerichtet waren, denn die ganze in solche Instituten erteilte Erziehung ist praktischer Art. Die Endergebnisse des Versuches sind noch nicht zugänglich aber nach schon erhaltenen Berichten ist es augenscheinlich, dass wohl künftighin der Berufspsychologe eine ziemliche Rolle sowohl in der Behandlung als in der Verhütung von Verbrechen spielen wird.

INTELLIGENCE TESTS FOR MENTAL AGES OF FOUR TO EIGHT YEARS

BY RAYMOND B. CATTELL AND HILDA BRISTOL

- I.—*The need for evaluation of old and invention of new tests.*
- II.—*An account of the tests selected for study.*
- III.—*The five new tests.*
- IV.—*Conditions of the experiment.*
- V.—*The saturation of tests with "g."*
- VI.—*Suitability as determined by length, difficulty, sex differences, and children's preferences.*
- VII.—*Indications for the construction of intelligence tests.*
- VIII.—*Comments and summary.*

I.—THE NEED FOR EVALUATION OF OLD AND INVENTION OF NEW TESTS.

To produce tests of intelligence for young children it is necessary not only to discover tests which are good measures of "g" but also tests which have an immediate and intrinsic appeal to the child mind. Clearly, a true measure of mental capacity is only being made when the strongest possible drive is at work in solving the problems set. With older children and adults the strongly established self-regarding sentiment and the disciplined sentiments connected with school life provide sufficient motivation in normal circumstances to ensure full use of whatever intelligence is possessed. But with children of four and five one must fall back upon unorganized instinctive drives and depend very little—ideally not at all—upon school atmosphere and the mere desire to please an adult, if truly valid results are to be obtained. The test must resemble a game and borrow the glamour of games or else it must simply be presented as a means to some immediate instinctive satisfaction, as Köhler's test situations appeared to his chimpanzees.

Most of the tests which have been used in assessing the intelligence of young children certainly satisfy pretty well the requirement of inherent attractiveness, for many of the items are taken over, with little or no modification, from nursery activities. It is as tests of intelligence that they are open to criticism. Many of the items in Kindergarten and pre-school tests are flagrantly tests of acquired habit and knowledge,*

* Objective evidence already exists of the excessive part played by knowledge. Cyril Burt has himself pointed out, from the examination of partial co-efficients, "there can therefore be little doubt that with the Binet-Simon scale a child's mental age is a measure not only of the amount of intelligence with which he is congenitally endowed . . . it is also an index, large if not mainly, of the mass of scholastic information and skill . . . which he has accumulated in school."—*Mental and Scholastic Tests*, p. 182.

e.g., tying a bow, naming colours, naming objects in a picture, fastening buttons, building a tower of bricks. Others, as far as observation and introspective analysis can tell us, are almost certainly measures of initiative, foresight, and such qualities as spontaneity or quickness of movement, which are probably related to temperament differences.* Form boards put a premium on the last-named quality; tests requiring invented instead of selected answers test temperamental spontaneity (Garnett's "c" factor); mazes as commonly scored penalize the impulsive child who lacks foresight, whilst picture description demands initiative and lack of nervousness.† Finally, in most of the individual tests over this age range, but especially in the Binet-Simon, there is far too much scope for the personal and subjective impressions of the examiner. The alarming extent of the error due to this lack of objectivity can only be realized by those who have compared the scores made by the same child with a sympathetic and unsympathetic examiner respectively. And even with the same examiner there may be a tendency for the bright-looking, well-groomed, unrepressed child to be given a higher I.Q. than his equally intelligent but less attractive and more diffident class-mate, in consequence of the accumulation of items on which his semi-correct, bright, verbose answers have been given the benefit of the doubt. All three of these objections—dilution of the measurements with learnt responses, with temperament and character qualities, and with the personal reactions of the examiner—apply equally, of course, to the higher levels of the Binet Scale. Yet, wherever contact with the main stream of psychological research is superficial, these tests have been retained, in spite of more than a quarter of a century of progress involving fundamental advances.

No experimental work appears to have been undertaken to discover the validity of the various types of test item in a test consisting of numerous components such as the Binet-Simon.‡ This could only be done

* Recent work indicates that quickness and originality are closely linked in a broad temperament factor. See "Temperament Tests," R. B. Cattell, *Brit. J. Psych.*, Jan., 1933.

† No research appears to have been done directly on the affective relationships of examiner and examinee which are likely to introduce so large an error into individual testing. Goodenough, "The Kuhlmann-Binet Tests for Children of Pre-School Age. A Critical Study and Evaluation," *Inst. Child Welf. Mon.*, 1928, No. 2, compared the change in intelligence measurement on a first and second examination with the change in rating on a number of temperament traits of the examinee. A correlation of .36 for shyness and .36 for negativeness was found, indicating that these play no small part in blanketing the real manifestations of intelligence.

‡ Wallin, "A statistical study of the individual tests in age VIII and IX in the Stanford-Binet scale," *Ment. Meas. Monro.*, 1929, No. 6 has begun such an enquiry. He found that Counting Backwards and Vocabulary at the eight-year level failed to discriminate normal, sub-normal, and feeble-minded groups, while in the nine-year tests the life experience of the older and duller compensated for lack of brightness.

satisfactorily by constructing a whole series of items on the model of each type of item being studied and inter-correlating the scores on each type series.

Such a procedure carried out for all the types of test now in use in various scales for children of four to eight years would be an enormous undertaking. So thorough a sifting we did not attempt, for many types of test in use can be neglected forthwith on an analysis of the mental processes involved in them, whilst the very best of them may prove to be poorer than others yet to be invented. Indeed the salvaging of such tests promises to be a less profitable task than the construction and assessment of new tests under the guidance of our knowledge of "g" as the ability to perceive and employ complex relations. The plan of our present research was therefore to take a chance sampling of tests commonly used with children of this age; to add to them half a dozen new tests constructed in accordance with the principles just developed, and to examine all of them with regard to correlation with "g," attractiveness to children, suitability as regards degree of difficulty and other criteria.

II.—AN ACCOUNT OF THE TESTS SELECTED FOR STUDY.

The following varieties of tests were taken as samples from current intelligence tests scales. In each instance the number of pass or fail items was expanded to ten by the addition of similar test items of a degree of difficulty (found by preliminary experiment) such that the average child of six would achieve a score of about five out of ten. Where ten items were already present in these samples from current tests the degree of difficulty was assumed to be correct, since the scales consulted were those intended for children of this age.

A short description of the essential nature of each test, together with a note on well-known intelligence scales in which it occurs, is given below. The actual example used in the present assessment is also given, with details of scoring where necessary. Of course, only scales that are in use in the four to eight year range are listed below.

(1) *Form Board Test.*

The principle of the form board test—choosing from among several shapes the shape (in two or three dimensions) which fits a given space—underlies the greater part of the heterogeneous medley known as Performance Tests. It demands the perception of spatial relations, the use of immediate memory and a fair amount of manual dexterity (when scored on timing).

Occurrence.—Pintner Paterson Performance Scale (Seguin Five Figure, Two Figure, Casuist, Triangle, Diagonal, Healy A, etc.). Miss Newell* lists thirty-four form boards on which more or less extensive research has been done. Intelligence is also measured by this principle in the Worcester Form Board Series, Dearborn Form Boards, Ferguson Form Boards, Witmer Cylinders, Wallin Peg Boards (Marrill-Palmer Scale) and in a modified form in the Kingsbury Primary Intelligence Tests. A complete Intelligence Test for young children on this principle has been brought out by Atkins.†

Present Assessment.—Made on a Séguin board as used in the Merrill-Palmer Tests. Standard presentation. Score as mean time of two trials. Other methods of scoring will be compared for extent of correlation in a later paper; this method approximated best to current methods.

(2) *Decroly Matching Game.*

Here the child has to match shapes with shapes of a more complex but meaningful form than occur in most form boards. Rather greater demand is made on attention and immediate memory, but the element of manual dexterity is practically eliminated.

Occurrence.—Merrill-Palmer Tests.

Present Assessment.—As in Merrill-Palmer on time and errors of one performance. No errors were in fact made by the six-year-olds, so the scoring was on time alone.

(3) *Picture Completion.*

This test occurs in two forms. In one the child is asked to describe what is missing, in the other he is asked to pick out from a number of alternatives the part required to complete the picture. The latter seems preferable as it puts no premium on reproductive capacity or the ability to describe. If the test is truly analogous to sentence completion one would expect it to be an excellent test of "g."

Occurrence.—Binet (age six), Healy P.C.1 and P.C.2, Rhode Island Intelligence Test, Pintner non-language Test, Detroit Advanced First Grade, Pintner-Cunningham Primary, Otis Primary, Kuhlmann-Anderson, and Sleight non-verbal.

Present Assessment.—On ten completion pictures each with four alternatives supplied. Pictures designed to direct attention on choice between alternatives rather than on searching the picture for what is missing. One demonstration item. Instruction to point with finger.

(4) *Substitution or Code Test.*

Throughout a page of printed symbols the child is asked to substitute sign for sign according to a key given at the head of the paper. Immediate

* "The uses of the Form Board in the Mental Measurement of Children," *Psych. Bull.* 28, 1931, p. 309.

† "The Measurement of Intelligence of Young Children in an Object Fitting Test." University of Minnesota monograph.

memory is in demand and speed of writing, but there seems to be no reason for expecting this to be a good test of intelligence, unless it can be shown that rapid memorizing of the key results in better performance than rapid mechanical use of the key.

Occurrence.—Very widely used for slightly older children but in this age range only Pintner-Paterson Scale, Otis Primary, and Sleight non-verbal Test.

Present Assessment.—Otis Primary. Score number of items substituted correctly in one minute, divided by four to give a possible score of ten.

(5) *Maze Test.*

Here the child looks on a printed plan of a maze and runs a pencil down the pathways to mark the shortest way out. Ability to appreciate spatial relationships, together with a character-temperament quality resulting in deliberateness and foresight, seem important for success in this test.

Occurrence.—Porteus Maze Tests and Otis Primary Intelligence Test.

Present Assessment.—Otis Primary Tests, given in standard time, and scored on number of maze boxes correctly completed, i.e., ignoring rectified errors but not jumping of walls. This gives a possible score of ten.

(6) *Immediate Memory or Similarities.*

In tests of this type a visual or auditory presentation is made and the child is asked either to reproduce it or recognize it from among a number of similars presented immediately afterwards.

Occurrence.—Binet, ages four and seven (and others outside this range). Here it occurs both in visual form (reproducing shapes) and auditory (repeating digits). Detroit First Grade, Rhode Island, Detroit Advanced First Grade, Pintner-Cunningham Primary and Kuhlmann-Anderson.

Present Assessment.—Visual recognition form, Detroit First Grade, in which the child sees the form on one part of the paper and picks out an identical form from another part. Five items were added to bring the possible score up to ten.

(7) *Social Groupings.*

This is a kind of General Knowledge Test working in a restricted field. The child is asked to say what the people depicted in his sketch are, e.g., fireman, sailor, clergyman, butcher, (from their dress). One would scarcely expect success in this test to have much relation to intelligence among children of varied education and home environment.

Occurrence.—Involved in Binet Picture Description, age seven, Rhode Island Intelligence Test.

Present Assessment.—On two items in Rhode Island Test to which eight similar items had been added to bring the score up to ten.

(8) *Wrong Pictures.*

The ability required in this test, in which the child points out what is wrong in pictures of familiar objects, is obviously very closely related to that in Picture Completion. In so far as the child has to describe what is wrong—a performance depending on vocabulary and temperamental readiness to risk a foolish answer—this test is perhaps less satisfactory than the latter.

Occurrence.—Detroit First Grade, Kuhlmann-Anderson, Sleight non-verbal, and others.

Present Assessment.—On three items from the Detroit First Grade Tests to which seven new items had been added.

(9) *Memory or General Knowledge.*

Here success is almost wholly dependent on general knowledge and memory for the names of things. The child is either asked to name objects or to pick out objects after the names have been given.

Occurrence.—Binet, ages three, six, seven, and eight (naming coins) describing pictures, etc. Detroit First Grade, Pintner-Cunningham, Detroit Advanced First Grade, Kingsbury Primary, and Kuhlmann-Anderson.

Present Assessment.—On use of Detroit First Grade, with five added items to produce score of ten.

(10) *Æsthetic Judgment.*

The child is asked to say which of two or more faces, houses, animals, etc., is the more attractive and pretty. Since the vagaries of individual experience and temperamental make-up do strongly affect taste, one would scarcely expect this to be a reliable test.

Occurrence.—Binet, aged five, Pintner-Cunningham, Kuhlmann-Anderson, Grade I.

Present Assessment.—On Binet faces, plus Pintner-Cunningham animals, houses, etc., plus a clock item to bring the possible score to ten.

(11) *Following Directions.*

The child may either execute commands with a pencil on a printed sheet or carry out commissions about the room. The latter seems preferable from the point of view of interesting and pleasing the child. In either cases in addition to the task of intelligently understanding the instructions, the child has to keep the various points in mind during the interval between listening and being allowed to start, so that memory is also involved.

Occurrence.—Binet, age five, Detroit First Grade, Kingsbury Primary, and in a less straightforward fashion in many other tests.

Present Assessment.—Two Binet items, plus eight new ones of which the following are typical. (6) Walk to one end of the table. Put one hand on your head and the other on the table. Then lift one foot from the ground. (8) Take the square piece of paper from the table. Put it on the chair by the door. Then put the smaller of the two books that are on the table on top of it. Each instruction was repeated twice.

(12) *Colour naming.*

The child is asked to name a number of colours presented on strips of paper. The test appears to be one of general knowledge once more. Doubtless it discriminates well between children of various ages, for Baldwin and Stecher* have pointed out that ability to sort colours shows a marked and regular increase between the ages of two and six. But that is no proof whatsoever that it is a test of intelligence. There also appears to be a sex difference in favour of girls.† These facts alone suggest that it will turn out to be a poor test, but the existence of the sensory defect of colour blindness should be a final cause for its rejection.

Occurrence.—Binet Scale, age five. In a modified form—colour sorting—in the Merrill-Palmer Scale.

Present Assessment.—The four Binet colours, plus six more difficult secondary colours, including grey.

(13) *Manikin Test.*

The child is supplied with body, arms, legs, and head of a wooden man and asked to put the parts together as quickly as possible. Tests of this kind, in which a familiar object or picture is to be put together, involve the perception of fairly complex spatial and causal relationships, but it is possible that purely reproductive activities and the excessive opportunities for exploratory trial and error frequently required, e.g., in tests approaching the jig-saw type, prevent such tests from being good measures of "g."

Occurrence.—Binet Scale, age five (fitting parts together), A mare and foal, feature profile, ship test, and other tests, e.g., Merrill-Palmer picture puzzles I, II, and III, involving the Manikin principle in still more modified form. The Goodenough drawing of a man probably deals with a similar ability but with executive drawing ability added.

Present Assessment.—Standard scoring of Manikin as in Merrill-Palmer Scale, with, in addition, one point for completing Manikin in less than fifty-five seconds, two points for less than forty-five seconds, three for less than thirty-five, four for less than twenty-five, and five for less than ten seconds.

* "The Psychology of the Pre-School Child."

† "On the Colour Vocabulary of Children." *Nebraska University Studies*, 1890, I, p. 205., by H. K. Wolfe.

III.—THE FIVE NEW TESTS.

The five new tests, survivors of more than a dozen new types tried out in a preliminary way, were constructed under the guidance of three principles: (1) to involve the perception and use of relations; (2) to make only the smallest demands on knowledge or acquired skill; (3) to interest the child through activity, play element, or pictorial presentation.

(1) *Line's Test.*

A type of test requiring neither verbal knowledge nor general knowledge of objects has already been used by Line* with older children and shown to be highly saturated with "g." Diagrams of two kinds on cards are sorted into two heaps according to their essential types, individual and "accidental" variations being discounted. The ability to educe relations and correlates is required in a high degree here in the feat of abstracting the essential type. This test is really a modification of the well-proven classifications test which is too artificial to interest young children. Line's Test was modified to suit very young children by putting animals, toys, etc., in place of geometric forms without, however, causing the judgment to be made on remembered rather than perceived qualities—an important point. Everything necessary for the classification was given in the pictures. It was started with extremely simple examples including a demonstration set consisting of noughts and crosses of various sizes and thicknesses. The sorting of the cards and the ritual of saying "this kind" and "that kind" provided the play element which pleased the children. In the older form of classification test this principle has been used in the Kuhlmann-Anderson, Sleight Non-Verbal scale, and others.

(2) *Riddles Test.*

The ordinary riddle, beloved of children when they are a few years older, promises, when modified, to be an excellent test of the appreciation of relations, especially when the inter-play of conditions laid down is more important than mere reproductive ability. To eliminate the factor of fertility of reproduction, the child must be asked to select from given alternative answers. Differences in general knowledge can be eliminated to a large extent by making even the more difficult items from material well within the experience of four and five-year-olds. The Merrill-Palmer Action-Agent Test—'what tuns?', etc.—is somewhat similar, but by imposing

* See *Brit. Journ. Psychol.* monograph supplement No. 15, 1930, "The growth of visual perception in children," by W. Line.

only one condition and failing to supply alternatives for choice it becomes more a test of reproductive than eductive facility. Examples—What things are green and grow on trees? Grass, lamp-posts, leaves? What is round and flat? An apple, a penny, a book, or a leaf? What is it that you can hear and feel but cannot see? Rain, wind, snow, lightning? Each riddle was read twice with the alternatives presented first in order to prevent guessing.

(3) *Series Tests.*

In the ordinary Series Test the relation of two adjacent items has to be educed, compared with the relation of subsequent adjacent items and applied to the end term to educe as a correlate the next term of the series. For this reason it bids fair to be a good test of "g," but in practice the test can only be made sufficiently difficult for older children and adults by resorting to mathematical forms, and this almost certainly brings with it the exercise of a restricted, special mathematical aptitude.

With young children this difficulty does not arise. Pictures on cards of objects which formed a series or sequence were shown (four cards placed in order) and the child was asked to choose from four remaining cards the one which should come next (i.e., be placed fifth on the series). The items included—a candle burning shorter and shorter; one, two, three, four, and five sparrows on a twig; boy and girl alternately, joining hands in a row; two propellers revolving in opposite directions in subsequent positions.

There are two drawbacks to this test, (1) the difficulty of conveying the notion of a series to the duller four and five-year-olds, which prevents their scoring even one or two out of ten. (2) The relative lack of interest, which interest indeed is only maintained by the pictorial presentation and the activity of handling cards. A test similar in principle occurs in Sleight's Non-Verbal Test.

(4) *Inference Stories.*

Inference tests have proved good measures of intelligence with older children. The present attempt to adapt them to very young children consisted in making a story out of each problem. Although this aroused interest it made the test far too long, and eventually a compromise was made in which with considerable curtailment of the account, an attempt was still made to preserve the story atmosphere. Secondly, a child was not required to be logical in a pedantic, mathematical fashion, confining himself only to given premises, but was expected to

reason in his natural manner, employing common sense. In the first example below, for instance, he naturally assumes that the bigger boy is the stronger, the usual state of affairs among young children. (2) My brother Tom is much bigger than I am, but Willie is smaller. I want to take my wooden horse into the garden. but it is too heavy for me to carry alone. Shall I ask Tom or Willie to help me? (4) Yesterday I found a robin's nest at the bottom of the garden with four eggs in it. This morning I met Billy Green carrying two of the eggs away so I made him take them back at once, but he dropped one and smashed it on the way back. How many eggs will there be in the nest now? (10) Mother has gone to the Post Office or the butcher's or the grocer's. The Post Office is at the corner, further than the butcher's but not so far as the grocer's. She told nurse she would not be going as far as the Post Office, where do you think she has gone?

(5) *Puzzle Boxes.*

As we have already pointed out, the ideal kind of test for children under five or six would seem to be one in which the solution is part and parcel of the attainment of some instinctive goal. We started on the plan of putting sweets in a puzzle box, so constructed that familiarity with mechanical devices would not alone permit of its being opened. The situations were of such a kind as Köhler presented to apes, requiring appreciations of spatial relationships and readiness to perceive the uses to which objects could be adapted. They were also designed, as far as possible, to require the satisfaction of two or three conditions simultaneously in opening the box, in order to avoid solutions by lucky random manipulation. The sides of the boxes were of wire openwork, so that everything could be seen and every movable part was pointed out to the child before the box was handed to him. It was soon evident that the interest aroused by these boxes was so great that small dolls and other attractive but inedible objects could be substituted for sweets without impairing the children's zeal to solve the problems. In the actual tests, beads, dolls, and wooden objects were used.

IV.—CONDITIONS OF THE EXPERIMENT.

Conclusions in the field of intelligence testing are frequently rendered of little value owing to the failure to eliminate sources of spurious correlation, notably that arising from a wide scatter of ages. The population chosen for the present research was highly selected for age, consisting of

100 boys and girls of six years of age (six being the middle year of the age range for which the tests were being designed). None was less than five and a half or more than six and a half, with the exception of six children who missed the limits by one or two months. It seemed inadvisable to take a group of one sex only, for spurious correlation could only arise from a mixture of sexes if a distinct sex difference should exist in the abilities measured. Since the sex difference in regard to "g" has repeatedly been shown to be negligible, any test showing a marked sex difference would on that ground alone be excluded from the final test battery. With regard to choosing a wide or restricted variation of education the issues are by no means simple. Whilst a perfectly uniform group would give no false correlation values, the tests would only have been proved to be good tests of "g" for children possessing that particular education. For example, many current tests requiring a rather high degree of general knowledge and training may appear from correlations to be good tests of "g" among well educated children but would really be grossly unfair to and ineffective with poorly educated children, or in a group of children of very mixed types. A desirable test of intelligence in all testing situations is one as valid for uneducated as for well educated subjects.

From this it would appear that the experimental group should be one containing children of all shades of school and home background. Now this condition may be satisfied without producing spurious correlation providing that the group does not consist of children well and poorly educated with respect to one pattern of education only. In the latter state of affairs correlations would arise which are only correlations between various branches of the impressed education, not between native abilities sharing "g." The 100 children in the present research were compounded in about equal numbers from the following sources: a London City elementary school, two private schools, three rural elementary schools, a suburban elementary school, and a modern progressive school.

The detailed conditions of testing were as follows. Three examiners collected data, since it is desirable to know the value of the tests for the average examiner, not merely for a particular examiner who might have some idiosyncrasy of presentation. It is almost as necessary to eliminate this personal equation as it is to render the results independent of educational peculiarities in the subjects.

The tests were given in the following order, which was planned to facilitate "warming-up" and to bring the more interesting material at the end of each half session where boredom might otherwise arise. Each

child, whenever possible (in the majority of instances), completed the tests on one day in two sittings of about three-quarters of an hour each, with an interval of about fifteen minutes between. In no instance was the testing split into more than three sessions or spread over more than two days.

Order of Presentation of Tests :

Séguin Form Board, Decroly Matching Game, Picture Completion, Series Test, Inference Stories, Line's Test, Riddles, Puzzle Boxes, Substitution Test, Maze Test, Social Groupings, Wrong Pictures, Similarities Test, Memory (General Knowledge), Following Directions, Æsthetic Judgment, Naming Colours, Manikin.

The instructions, the essentials of which are given in the above descriptions of tests, were in every case stereotyped as to wording. No indication was given when errors were made, but children were liberally congratulated and encouraged whenever no clue to the solutions was given thereby. Children were allowed to finish puzzle boxes without interruption, for their own satisfaction, although they might have exceeded the time limit.

V.—THE SATURATION OF TESTS WITH "G."

With the exception of the first two tests, all tests were scored on a possible ten points. Correlations of all tests with one another, worked out on the Bravais-Pearson formula, are shewn in Table I. The signs of the correlations from the two "time" tests have been reversed, since a high numerical value means a poor score. The tests have been arranged in the order of magnitude of their mean correlation with all other tests. This mean has been calculated from co-efficients taken to three places of decimals, not from co-efficients corrected to two places as in the table. Reliability co-efficients are not shewn since they have been worked out often enough for these tests and since a co-efficient worked out on odd and even items has very little meaning. Moreover a good test of "g" must, *ipso facto*, be a reliable test, whereas a reliable test may yet not be a good test of anything in particular.

It may later be possible to give similar tests on two distinct occasions to the same individual and so get a true reliability co-efficient.

TABLE I.
INTER-CORRELATIONS OF EIGHTEEN TYPES OF TEST.

<i>Tests.</i>	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.	L.	M.	N.	O.	P.	Q.	R.	Mean Correlation with other Tests.
Memory (Gen. Know.) ..	A.																		.420
Mazes ..	B.	.52																	.11
Riddles ..	C.	.56	.46																.34
Line's ..	D.	.49	.57	.49															.37
Following Directions ..	E.	.48	.37	.59	.41														.20
Substitution ..	F.	.54	.41	.46	.50	.49													.23
Similarities ..	G.	.38	.35	.36	.40	.42	.41												.33
Inference Stories ..	H.	.53	.48	.60	.50	.40	.31	.37											.32
Wrong Pictures ..	I.	.43	.40	.31	.47	.30	.38	.41	.32										.28
Aesthetic Judgment ..	J.	.42	.47	.40	.32	.46	.36	.51	.20	.32									.16
Manikin ..	K.	.43	.40	.49	.44	.45	.39	.41	.36	.43	.33								.367
Decroy Matching Game..	L.	.39	.33	.48	.31	.41	.39	.31	.37	.36	.41	.22							.373
Series ..	M.	.27	.51	.40	.50	.45	.38	.45	.40	.35	.20	.31	.24						.351
Séguin Form Board ..	N.	.46	.33	.35	.35	.38	.38	.33	.27	.32	.34	.33	.46	.23					.344
Naming Colours ..	O.	.51	.39	.40	.37	.38	.33	.34	.31	.26	.47	.24	.22	.09	.32				.339
Social Groupings ..	P.	.27	.35	.26	.32	.25	.17	.27	.25	.40	.29	.18	.44	.20	.32	.30			.326
Puzzles Boxes ..	Q.	.34	.37	.23	.25	.32	.29	.26	.29	.21	.14	.21	.29	.30	.29	.30	.27		.317
Picture Completion ..	R.	.11	.34	.20	.33	.28	.16	.28	.24	.32	.21	.24	.15	.32	.12	.22	.25		.279
																			.232

(The intercorrelations of the ten best tests—the tests selected for further study—are cut off by heavy lines from the remaining coefficients.)

have as yet no reason to suppose that such factors exist here, and for final use we shall first disprove the existence of such overlapping group factors among the tests selected.

Our purpose is to provide a battery of tests satisfying the criteria of high saturation with "g," attractiveness to children and maximum diagnostic value with restricted duration. A total duration for the test battery of about three-quarters of an hour seems a reasonable compromise with reliability, convenience, and the child's tendency to fatigue. A battery of seven or eight tests would occupy about this time. One might reasonably expect that this number might survive from the initial group of ten taken from the above table (Table I), after the rejection of tests containing overlapping special factors or which proved unpopular or too lengthy or inconvenient. Only the first ten tests were examined, therefore, according to the tetrad difference criterion (630 tetrads). The very extensive task of working out tetrads for all eighteen tests (9,180 tetrads) may be undertaken as a matter of theoretical interest at a later date, but we confine ourselves at present to the practical purpose of selecting a battery of tests.

The 630 tetrad differences distributed themselves as on page 155.

The actual quartile is at .044. The theoretical p.e., worked out in accordance with the formula* of Spearman which has been proved reliable by many previous researches, is .061. Not only is the distribution approximately normal but the p.e. is well within the theoretical p.e. It is therefore safe to conclude that these ten tests are free from any marked group factor over and above "g."

Nevertheless, in order to remove any suspicion of a remaining group factor, and also as a matter of theoretical interest, a search was made for the connections associated with the largest tetrads. The first proved to be *Riddles-Inference Stories* followed closely by *Similarities-Æsthetic Judgment*. It is reasonable to assume that the specificity common to the first two lies in the entirely oral and verbal presentation. It might well reside in short distance auditory memory (for *Riddles* and *Following Directions* also have a distinctly large tetrad difference average). The specificity of the second pair is comparatively obscure. Both require a rapid comparison and contrast of visual forms, but the same can be said of many other tests. In these other tests (e.g. Line's, Substitution), however, the perception of exact, detailed shape is less important. It seems probable that we are dealing here with specific visual and auditory memory functions such as have been indicated by researches on a general factor in memory.

* P.e. = $\frac{1.949}{N^{\frac{1}{2}}} [r^2 (1-r)^2 + (1-R) S^2]^{\frac{1}{2}}$ See "Abilities of Man," Appendix XI.

VI.—SUITABILITY AS DETERMINED BY LENGTH, DIFFICULTY, SEX DIFFERENCES AND CHILDREN'S PREFERENCES.

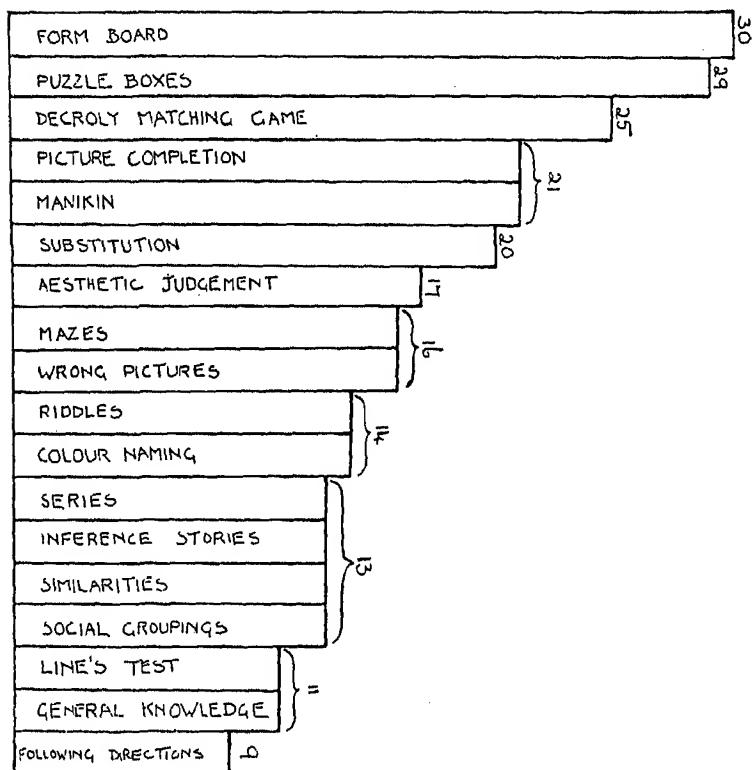
Before applying the above knowledge to the construction of a test battery we have to take into consideration other findings.

It is generally recognized that the most reliable method of establishing an order of preference with regard to a series of items is to make paired

DIAGRAM II.

CHILDREN'S PREFERENCES.

CHOICES IN 306 PAIRED COMPARISONS.



(Figures at the right indicate the number of times the test has been chosen by children in preference to another test. The columns are proportional in height to the numbers.)

comparisons of each item singly with every other item and then rank the items in order of preferences gained. To cover our eighteen tests 153 paired comparisons were necessary. Actually the ground was covered twice, 306 paired comparisons being made. Since it was quite impossible to get each child to make 306 comparisons—or even 30—while the tests were still fresh in his mind, the 306 comparisons were divided up as equally as possible (three to each child) among the 100 children. The judgments were made immediately after the testing and the child was asked not merely “which do you like?” but “which would you rather do again, this or this?” (pointing to the exposed test material). The tests ranked as given on page 157.

On the whole the tests in which the child is active and uses some concrete piece of apparatus seem most preferred. Yet such a test actually stands at the tail end of the preferences. This test—Following Directions—can, more than any other test, be made attractive or unattractive according to the skill of the examiner and by quite minor modifications. With some attention to making it a game and removing any atmosphere of embarrassment it would almost certainly resume its place with its kind at the head of the list and be in no danger of rejection.

For another reason preferences cannot always be accepted at their face value. It is usual to find that, quite apart from the nature of the test, the easiest tests are most liked.* The present tests show a correlation of -0.1 between difficulty (see below) and preference, which is not high enough, however, to justify much alteration of the above preference order.†

The relative difficulty of the tests can be gauged from the following average scores, which, however, are set out here primarily to reveal sex differences in performance. Scores are as marks (items passed) out of a possible ten, except in the first two tests, which are scored in seconds and cannot, of course, be compared with the other tests with respect to difficulty.

* See “The Relation of Reported Preference to Performance in Problem Solving,” by H. L. Bowman, *Journ. Educ. Psych.*, April, 1932, where a correlation of $+0.46-0.03$ was found between preference and goodness of performance.

† There is also a correlation of preference with length of test amounting to -0.3 and of difficulty with length of test amounting to 0.4 . Partialling out length of test, therefore, the correlation of difficulty with preference becomes quite insignificant ($+0.03$).

TABLE II.

DIFFICULTY, SCATTER, AND SEX DIFFERENCE OF TESTS.

<i>Mean Deviation.</i>	<i>Test.</i>	<i>Average Score. Boys.</i>	<i>Average Score. Girls.</i>	<i>Differ- ence.</i>	<i>Girls or Boys leading.</i>
11.47	Séguin Form Board	<i>Secs.</i> 46.56	<i>Secs.</i> 43.48	<i>Secs.</i> 3.08	G.
33.14	Decroly Matching Game	115.30	95.74	19.56	G.
		<i>Marks.</i>	<i>Marks.</i>	<i>Marks.</i>	
1.37	Picture Completion	5.83	6.52	.69	G.
1.35	Series	4.28	4.77	.49	G.
1.57	Inference Stories	6.00	6.48	.48	G.
1.37	Line's Test	3.79	4.02	.23	G.
1.46	Riddles	6.32	6.63	.31	G.
1.29	Puzzle Boxes	5.98	5.56	.42	B.
1.60	Substitution	6.62	7.38	.76	G.
2.39	Mazes	3.46	3.23	.23	B.
1.04	Social Groupings	8.22	7.64	.58	B.
1.20	Wrong Pictures	4.77	5.02	.25	G.
1.41	Similarities	6.17	6.77	.60	G.
1.36	Memory (General Knowledge)	7.52	7.46	.06	B.
1.55	Following Direction	6.38	7.15	.77	G.
1.52	Æsthetic Judgment	7.43	8.17	.74	G.
1.44	Naming Colours	7.56	8.13	.57	G.
2.19	Manikin	3.94	4.50	.56	G.
	Total Average	5.91	6.28		
	Average age of boys (in years)	5.96			
	Average age of girls (in years)		5.98		

From the total average score it is evident that we have chanced to hit on a slightly more intelligent sample of girls than of boys. In discovering more precisely the tests which particularly favour either boys or girls the raw difference score is not enough. A true comparison is best obtained through dividing this firstly by the actual score (i.e. expressing it as a percentage of the actual score of the lower group) to render the difference independent of the difficulty of the test, and secondly by dividing it by the deviation or scatter which exists in the combined group. For this deviation expresses the natural variability of score on the test arising from the fineness of its grading, which should be eliminated in comparing test with test for sex differences, since these differences would appear exaggerated in tests giving large differences in score for fine differences in ability. The mean deviations on each test have therefore been inserted in the above table (left). On this truer basis of comparison the tests especially favouring boys and girls respectively are as follows (first four tests at each extreme) :

TABLE III.

TESTS SHOWING MOST MARKED SEX DIFFERENCES. DIFFERENCES
REDUCED TO COMPARABLE INDICES.

<i>Favouring Boys.</i>	<i>Index.</i>	<i>Favouring Girls.</i>	<i>Index.</i>
Social Groupings	+·0680	Picture Completion ..	+·0863
Puzzle Boxes	+·0545	Series	+·0847
Mazes	+·0278	Following Directions ..	+·0780
General Knowledge ..	+·0059	Substitution	+·0717

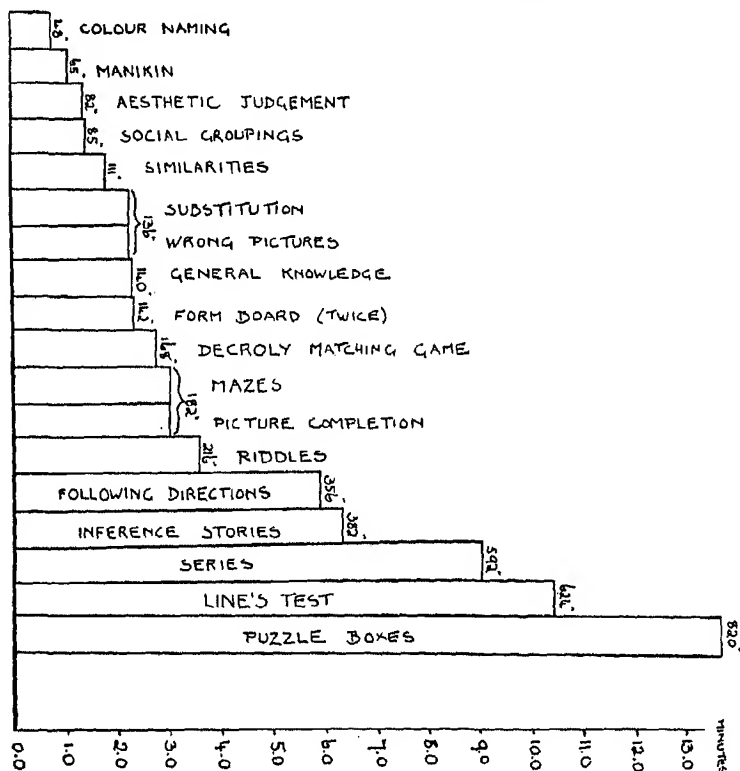
On the one hand (boys) tests demanding planfulness, resource, knowledge of the world; on the other, tests requiring deftness of hand, quickness to apprehend, ability to follow faithfully certain instructions and a sense of the appropriateness of things.

Since in no good intelligence tests in general use is there any marked difference of performance between boys and girls, the existence of such a difference in any test is a contributory reason for rejecting the test from a battery. Social Groupings and Puzzle Boxes might therefore well be rejected purely on the ground that they are measuring extensively special sex-linked abilities. The tests better done by the girls cannot be so easily rejected since we have good reason to believe that we are dealing with a more intelligent sample of girls and the tests in question are amongst those correlating most highly in the pool.

Another consideration in assessing the suitability of tests from the standpoint of the test construction is the time taken by each. We have already given some weight to this in the children's preferences, for we found a slight tendency to dislike tests for lengthiness alone. For the purposes of test construction one wants tests which will give the maximum diagnostic evidence in the shortest time. In a sense the goodness of a test cannot be assessed apart from the time taken, for every increase in the length of a test produces a higher reliability co-efficient and therefore a higher correlation (when uncorrected for attenuation) with the rest of the pool. Of course this increase of correlation with the pool can only proceed up to a certain point; the point where reliability is well-nigh perfect and loss of correlation from attenuation is nil. Were that not so the whole of our procedure of evaluating tests by correlation with "g" would be useless. A poor test, however long and reliable, cannot therefore yield higher correlation with "g" than does a good test of moderate length. To make our tests fairly comparable and of approximately equal reliability (apart from the nature of the test) we made them

of equal length with regard to the number of items on which to pass or fail (10). This would permit a better comparison of the goodness of the very nature of the test than would mere equality of time length. Nevertheless, since in practice time is important, an undue lengthiness (for the same number of pass or fail items) is adequate reason for rejecting a test, and unless such tests as Puzzle Boxes, Line's Test, Series and Inference Stories are particularly desirable on other grounds, they must be dropped.

DIAGRAM III.
APPROXIMATE TIME REQUIRED FOR EACH TEST.
(AVERAGES FOR ONE EXAMINER.)



(Columns proportional in length to time required. Figures represent seconds.)

Allied to this problem is the question of degree of difficulty and extent of scatter, for these also effect the correlations of the tests without being part of their intrinsic nature. A test well adjusted in difficulty to the subjects' capacities will generally give a distinctly better correlation than a test of exactly similar nature and form which is either too easy

or too hard. A glance at Table II will show that there are no extreme variations of difficulty. A correlation of difficulty (inverted average score) with goodness of test (Table I) confirms this by yielding a quite insignificant co-efficient ($+.09 \pm .18$).

The extent of scatter in scores on a test is a matter bound up with the question of length, for whatever the actual number of items on which pass or failure is possible, the effective length, the number of items on which the sample of people concerned does in fact pass or fail, is measured by the scatter. Generally, with other things equal, the test of greater scatter (mean deviation) will yield rather greater correlation coefficients. Examined from this aspect our comparison of tests is not entirely satisfactory: a correlation of $+.36 \pm .15$ ($.41 \pm .15$ on ranking formula) exists between goodness and scatter. If the scatter is expressed in a more comparable form, however, by dividing the magnitude of the scatter (mean deviation) by the size of the average score the correlation is found to be $+.21 \pm .16$. With so few items (18 tests) the reliability of these coefficients is small and we can only conclude that a low positive correlation exists between scatter and goodness. From the point of view of constructing a test battery out of the identical tests used here this finding is not disconcerting, for their relative goodness remains as in Table I. But for concluding in a general way *which kind* of test is best this finding cannot be entirely overlooked. Two ways of allowing for differences of scatter suggest themselves; (1) to correct the coefficients by a mathematical formula to the values they would have if the scatter had been the same for all; (2) to estimate from regression coefficients the relative importance of scatter and goodness of tests in producing the final order and to correct the position of each test by allowing for its extent of scatter. The formulæ so far suggested for the former process are not widely approved,* whilst our data for the second are not very adequate. With regard to the practical object of making a test battery a possible course would be to use scatter only as a deciding factor when it is very extreme in either direction and when the test concerned is on the borderline of acceptance or rejection. Fortunately, with one exception (wrong pictures), the tests on the border line have very average deviations and do not owe their positions to extreme scatter values.

VII.—INDICATIONS FOR THE CONSTRUCTION OF INTELLIGENCE TESTS.

We desire to study the above data with two objectives: (1) the provision of the best possible test battery; and (2) the elucidation of

* We refer to the formulæ suggested by Professor Kelley and others.

general principles regarding the functioning of intelligence in young children. The latter will be left to the next section.

Before either can be approached we have to make some correction for the variation of scatter as it affects the order of goodness. With this object we calculated the regression coefficient of "goodness" (average correlation coefficient with the pool) with respect to scatter (magnitude of deviation). This worked out at .0628. It may best be interpreted by saying that other things (the nature of the test) being equal, a unit increase of deviation value above or below the average deviation of the tests will be accompanied by an increase of .0628 in the correlation coefficient. We may therefore hope to correct the correlation coefficients to truly comparable values by reducing tests to a standard average scatter, i.e., subtracting .0628 from the coefficient of a test one unit above the average scatter and *vice versa*.

The new values and order of goodness are as follows.

Séguin and Decroly tests have necessarily been omitted because their scatter is measured in seconds not in points on a ten point scale.

Memory (General Knowledge)	..	..	..	..	..	..	429
Line's Test	..	..	..	..	..	..	420
Riddles	..	..	..	..	..	..	416
Following Directions	..	..	..	..	..	..	398
Similarities	..	..	..	..	..	..	373
Wrong Pictures	..	..	..	..	..	..	370
Substitution	..	..	..	..	..	..	367
Inference Stories	..	..	..	..	..	..	360
Mazes	..	..	..	..	..	..	359
Æsthetic Judgment	..	..	..	..	..	..	343
Series	..	..	..	..	..	..	339
Naming Colours	..	..	..	..	..	..	321
Social Grouping	..	..	..	..	..	..	309
Manikin	..	..	..	..	..	..	300
Puzzle Boxes	..	..	..	..	..	..	284
Picture Completion	..	..	..	..	..	..	241

This is more nearly the order of goodness of the essential natures of the tests in relative abstraction from accidental features such as difficulty and scatter.

There are no outstanding differences in the upper part of the table from the order of Table I, with the exception of Wrong Pictures, which rises three places, and of Mazes, which falls seven.

In getting the final order* and correlation of the ten best tests from which to make our final selection we have to remember that the

<i>Correlations with Binet.</i>	<i>Test used by Stockton.</i>	<i>Essential Equivalent in our Tests.</i>
·68	Information	(General Knowledge).
·46	Pictorial Identities	(Similarities).
·45	Symbol Digit	(Substitution).
{ ·46	Series Completion }	(Series).
{ ·48	Pictorial Sequence }	
·42	Picture Completion	(Picture Completion).

average correlations (and those of Table I) are attenuated by including correlations with all the poorer tests. The average correlations of the ten best tests of Table I with themselves alone are as follows :

Memory (General Knowledge)	.. ..	·483
Riddles .. ..	.. ..	·470
Line's .. ..	.. ..	·461
Mazes .. ..	.. ..	·448
Following Directions .. ..	.. ..	·436
Substitution .. ..	.. ..	·429
Inference Stories .. ..	.. ..	·413
Similarities .. ..	.. ..	·401
Æsthetic Judgment .. ..	.. ..	·385
Wrong Pictures .. ..	.. ..	·383

Now from these we have to reject either Inference Stories or Riddles because they probably share a special ability. Inference Stories, being lower in correlation, is therefore struck out. Æsthetic Judgment is also under suspicion in this respect and is moreover very low on the list. It will therefore be left out of the battery.

One hesitates to cut down the battery to fewer than eight different tests, for in that way one runs again into the danger of giving an undue

* It is interesting to find that Stockton (*Psychological Monographs*, 1921, XXX, No. 137, "The Definition of Intelligence in Relation to Modern Methods of Mental Measurement," obtained the same order of goodness (with children of 9—13 years). The tests were, of course, not exactly similar to ours but we give the equivalent tests in this research in brackets in the list below. The correlations, too, were with the Binet test total, not with "g"; but the total Binet resultant is probably a fair approach to a "g" measurement.

weight to special abilities. The time required by these eight tests (about $33\frac{1}{2}$ minutes), too, is about suitable for the powers of concentration of 4—8-year-olds. On the other hand, it might be considered rather short for a reliable measurement. Similarities and Wrong Pictures are, however, distinctly low in correlation. The latter, we have just seen, is in its nature a distinctly better test than it appears here, and could be improved by increasing the scatter. This has been done and the test has been retained in the battery.

Turning to other factors influencing our judgment—time and preference—we find Line's test unduly long, whilst Similarities is the shortest of all those under consideration. This decides us to retain Similarities. Line's Test is, however, so good that its rejection is scarcely to be contemplated. We decided to shorten it by presenting all the cards of each kind at once instead of placing them down one by one. The "game" element is thereby somewhat diminished, but, since we have shown that children tend to dislike tests for their length alone, the attractiveness of the test is probably not diminished.

It is difficult to say how far this final selection should be modified by our last consideration—the children's preference. Following Directions, General Knowledge, and Line's Test are relatively so little liked that one might be moved to reject them in spite of their higher saturation with intelligence. It must be remembered, however, that they are judged in comparison with tests specially designed to be highly attractive. And the measurement of their goodness as intelligence tests—which places them high—already takes into account any effects due to lack of interest ; so that the interference due to lack of attractiveness cannot be very marked. Moreover, it is a striking fact that the tests least liked are precisely those which tap intelligence most. Of the five last tests in Diagram II, four are included in the ten best tests : of the five leading tests in the preference diagram not one is a good test. Perhaps the best tests, precisely because they make the biggest demands on general mental energy, are bound to be always the least liked—other things being equal.

The battery of tests for 4—8-year-olds was therefore made from the above surviving eight tests.* Each test was increased in length from ten to twelve items to bring the total time up to about 40 minutes, thus attempting a happy compromise between length, reliability, and the children's tendency to fatigue.

* This test battery, duly standardized, is being published as the Dartington Scale (Scale O in the Cattell Intelligence Tests) by Messrs. Harrap.

VIII.—COMMENTS AND SUMMARY.

Although the principles laid down at the beginning of this article, whilst critically examining current tests and in planning new ones, receive considerable confirmation, there are some striking and interesting exceptions. Tests demanding a high degree of ability to perceive relationships of a complex kind—Line's Test, Mazes, Riddles—do indeed come at the top of the list,* whilst those putting emphasis on other abilities—Form Board, Naming Colours, Social Groupings, Manikin—are revealed to be poor tests.

But, contrary to expectation, Series and Picture Completion rank low, whilst Substitution and Memory rank high. The latter test—apparently one of general knowledge rather than intelligence—is indeed an instance of the stone which the builders rejected having become the head of the corner. The tests requiring knowledge in restricted fields—Naming Colours, Social Groupings—do, however, definitely fail, as was predicted. This is in accord with the usual findings with older children and adults: that tests of general knowledge correlate well with intelligence but tests of restricted skills or knowledge scarcely at all.† The logic of our methods compels us to include General Knowledge in our battery because of its high correlations. But it is obvious that general knowledge is not intelligence. It is rather a consequence of the operations of intelligence. And such tests, measuring not the thing itself but its products, are always in some measure dangerous, for the usual correspondence may some day be absent, as when one tests a child brought up in very primitive surroundings (or a deaf child).

Even so the correlations are usually (for general knowledge) decidedly lower than for a reasonably good test of intelligence. Now the explanation of the unexpectedly high valuation found here probably lies in the conditions of this particular test. The child was told to "point to the drum, the lamp, the elephant, etc.," but not allowed to begin pointing until all had been uttered. That is to say, a good performance in immediate memory was necessary to success in the test. And that is

* Of the five new tests suggested, three actually appear in the first ten survivors. Series probably fails through the pooriness of interest aroused and the strangeness of the instruction. Puzzle Boxes evidently measure some special aptitude, but would in any case be rejected because of their great time consumption, (Diagram III) and their susceptibility to a sex difference.

† McCrae (see *Abilities of Man*, Spearman, p. 277), however, found a correlation of .83 between scholastic information and "g" but a much lower correlation of "g" with general information. We must remember here that for the schoolboy scholastic information is really the most general information, for it represents the universe most common to all the children, whereas "general information" depends on the vagaries of the home environment.

a striking feature of all the tests which, in spite of having little emphasis on comprehension of relations, have yet turned out good tests. It is particularly true of the three unexpectedly good tests—Memory (General Knowledge), Substitution, and Similarities.* From what is known of the nature of "g" it is not at all obvious that immediate memory is one of its manifestations. Confirmation of such a close connection in young children would be an important guide in designing intelligence tests for them and incidentally justify the use of such tests as Repeating Numbers in the Binet Scale.†

No obvious reason emerges, however, for the poor validity of Picture Completion or Series. The latter evoked very little interest, it is true (Diagram II), and some children confused the instruction with that for Line's Test. Picture Completion, on the other hand, seemed satisfactory in every way. Is it possible that the selective form is, contrary to experience with older children, less effective than the inventive form of this test? (though the Healy Tests are selective). Or must we admit that Picture Completion is in fact a poor test,‡ not to be compared, for some reason, with the analogous Sentence Completion test?

Puzzle Boxes had been introduced, it will be remembered, in an attempt to employ the situations used as intelligence tests with animals, in the hope of getting the full interest of young children. In spite of the immense drive which these tests undoubtedly evoked they have proved a complete failure. It was, of course, foreseen that the tests, being necessarily tests mainly of ability to handle spatial relations, were to a large extent tests of mechanical aptitude. But in accordance with the psychological law of diminishing returns (with high "g") we had expected that for the low intelligences of children the general ability factor would be called out to a greater extent than with higher intelligences,§ i.e.,

* Although the judgment of the similarity relationship is concerned here, this is not really the most difficult part of the operation.

† The results of Fischler and Ullert, "Contribution à l'étude des tests de mémoire immédiate," *Arch. de Psych.*, 1929, 21, however, do not bear out this suggestion. Memory for figures and forms showed no significant relationship to age, but memory for pictures, words, and phrases was much better. Perhaps we may conclude from this that immediate memory tests are only good tests of intelligence when the content is complex.

‡ Stockton's result (*op. cit.*) would favour such a conclusion.

§ According to this principle simple tests which show no high saturation with "g" in adults, or in a population of very able children, should show more saturation when correlated for a population of dull or very young children. In view of this we were a little surprised at the relatively low correlations found among all these tests with young children. Stockton, it is true, found that the tests which correlated quite well when used on children of 9—13 had lower inter-correlations on children of 7 and 8. He also found that the order of goodness altered. Our order agrees with his 9—13 year order, but not with the 7—8, and we are inclined to think that some disturbing factor must have appeared in his 7—8 group both to lower the correlations and to change their order.

that the test would also be well saturated with "g." The failure of this assumption makes one wonder to what extent Kohler and others are right in assessing the intelligence of apes by such situations.

The magnitude of the intercorrelation of these tests may seem surprisingly low compared with those usual in tests with older children (even the ten best tests fall only between .4 and .5 in correlation with "g"). These diminutive values are, of course, due to the shortness of the tests. Increased to thirty items (a value comparable with the length of most adult or school tests), the first two correlations taken, Memory with Mazes and Memory with Riddles, become, according to the Spearman-Brown prophecy formula, respectively, .78 and .79. For the purpose of finding the relative validity of the tests low correlations do not matter, but if they are to be compared with other research results they must first be brought on to the basis of a comparable length.

The main results of this research may be summarized as follows.

(a) A battery of eight tests adapted to children of four to eight years has been selected, on the basis of saturation with "g," freedom from group factors, attractiveness to young children, and length, from eighteen tests: (1) representative of most varieties in the field of general use; and (2) containing some new types constructed in accordance with the "relation" theory of "g."

(b) Tests most attractive to children are those involving action and concrete material and especially those making the least demand on intelligence.

(c) The best intelligence tests are those requiring either education of relations (and correlates) or effectiveness of immediate memory.

(d) A number of tests occurring in the Binet, the Merrill-Palmer, and various Performance Scales are relatively poor tests of intelligence.

We wish to thank the L.C.C., the headmistresses who kindly gave facilities, Miss Mildred Nevill, who carried out a good deal of the testing, and Mrs. M. H. Cattell for constant assistance in preparing the new test material.

RÉSUMÉ.

DES TESTS D'INTELLIGENCE POUR L'ÂGE INTELLECTUEL DE 4-8 ANS.

Partant de l'argument que la plupart des tests actuellement employés pour les enfants de 4-8 ans ont une validité basse, et dans l'espoir d'établir des principes généraux et de créer un ensemble solide de tests d'intelligence, les investigateurs se posèrent la tâche de démontrer la corrélation entre 18 types distincts de tests,

dont 13 étaient un choix représentatif des tests employés actuellement et 5 étaient nouvellement construits selon la théorie que "g" représente la capacité de discerner et d'employer des relations compliquées.

Les sujets étaient 50 garçons et 50 filles entre cinq ans et demi et six ans et demi. On établit aussi l'ordre de préférence des enfants par la méthode des paires de comparaisons. La validité des tests fut déterminée par le degré de leurs corrélations avec le facteur central.

Tout en tenant compte du détachement des facteurs centraux (le critère tetrads des différences), des préférences des enfants et de la durée des tests, on choisit sur les dix tests les plus valides, un ensemble de huit comprenant la Mémoire (Intelligence Générale), les Énigmes, le test des Lignes, les Labyrinthes, l'Exécution des Ordres, la Substitution, les Ressemblances, et les Tableaux contenant des Erreurs. Parmi les tests rejetés étaient les Tableaux de la Forme, les Groupements Sociaux, les Boîtes Enigmes, le Jugement Esthétique, les Noms des Couleurs, et le test du Mannequin. Les capacités qu'exigeaient le plus souvent les meilleurs tests semblaient être le pouvoir de discerner les relations, et la mémoire immédiate.

ÜBERSICHT.

INTELLIGENZPRÜFUNGEN FÜR EIN ALTER, DAS DEN NORMALEN GEISTIGEN LEISTUNGEN EINES KINDES VON VIER BIS ACHT JAHREN ENTSPRICHT.

In der Annahme, dass die meisten üblichen Tests für Kinder von 4-8 Jahren von geringem Wert sind, und in der Hoffnung, allgemeine Grundsätze aufzuklären und eine wertvolle Reihe von Intelligenztests hervorzubringen, stellten die Forscher sich die Aufgabe, 18 verschiedene Testtypen in Wechselbeziehung zu bringen, wovon 13 typische Auslesen von jetzt gebräuchlichen Tests und 5 im Einklang mit der Theorie neu aufgestellt wurden, dass "g" die Fähigkeit ist, verwickelte Beziehungen wahrzunehmen und anzuwenden.

Die Versuchspersonen waren fünfzig Knaben und fünfzig Mädchen zwischen $5\frac{1}{2}$ und $6\frac{1}{2}$ Jahren. Die Ordnung, in der sie die Tests vornahmen, wurde auch herausgearbeitet, und zwar durch die Methode der paarigen Vergleiche. Der Wert der Tests wurde durch den Grad ihrer Korrelationen mit dem allgemeinen Faktor bestimmt.

Indem man Rücksicht auf die Freiheit von Gruppenfaktoren (Kriterium der Vierzahlendifferenz), die Vorliebe der Kinder und Dauer der Tests nahm, wählte man eine Reihe von acht von den zehn besten Tests aus, die Erinnerung (Allgemeines Wissen), Rätsel, den Line'schen Test, Irreführung, Folge von Befehlen, Substitution, Ähnlichkeiten und falsche Bilder enthielten. Unter den abgewiesenen Tests befanden sich Formenbretter, soziale Gruppierungen, Vexierdosen, ästhetisches Urteil, das Nennen von Farben und der Manikin'sche Test. Die Schätzung von Verhältnissen und der wirksame Gebrauch des unmittelbaren Gedächtnisses schienen von grösstem Belang bei den besten Tests.

THE CRITERION OF ACCURACY IN REPRESENTATIONAL ART.

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- I.—*Introductory.*
- II.—*Definitions.*
- III.—*Historical résumé.*
 - (a) *The aims of art education.*
 - (b) *Present practice.*
- IV.—*Assumptions underlying present theory and practice.*
 - (a) *The view that all children are educable as graphic executants and that this is desirable.*
 - (b) *The view that representational drawing supplies the necessary technical skill for artistic expression.*
 - (c) *The view that technical knowledge and practical experience are necessary for complete appreciation of art.*
- V.—*'Drawing' and 'Art': a distinction and a submission.*
- VI.—*Ability in representational drawing.*
 - (a) *Three classes of executants.*
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 - (c) *Objections to present system.*
- VII.—*The psychology of the drawing act: Ayer's analysis.*
- VIII.—*Recent experimental research.*
 - (a) *Phenomenal regression (Thouless).*
 - (b) *Its relation to the teaching of the laws of perspective and to art instruction.*
- IX.—*Summary and conclusions.*
- References.*

I.—INTRODUCTORY.

THE opinion which this paper will express, and attempt to substantiate, is that the criterion of accuracy employed as a means of estimating drawing ability and accepted as an aim in the teaching of representational drawing is psychologically unsound and detrimental to the development of true artistic ability. It will be concerned to show that the æsthetic

and educational theory underlying the teaching of representational drawing is not only at variance with the historical development of world art, but is out of touch with modern tendencies in art and with the findings of modern psychology.

II.—DEFINITIONS.

At the outset it will be advisable to define several terms which will appear frequently throughout the paper. A clear understanding of these terms will materially aid in following the argument.

(1) *Drawing*.—The term "drawing" will be employed to connote (a) the act of reproducing upon paper or canvas in an artistic manner, the appearance of an object or objects as observed from a particular point of view, by means of lines, colours, tones and masses; and (b) the product of such an act.

(2) *Representational drawing*.—This term will be employed to connote (a) the act of reproducing as accurately as possible, upon paper or canvas, the supposed appearance of an object or group of objects as observed from a particular point of view; and (b) the product of such an act.

(3) *Art*.—This term will be employed to connote (a) a fundamental activity of man exercised for its own sake, issuing in the creation of sensuous objects, each of which expresses or embodies in its wholeness the psycho-physical state of its creator and yields him an immediate and unique satisfaction; and (b) the products of such an activity, generally called "works of art."

III.—HISTORICAL RÉSUMÉ.

(a) It has long been recognized that the aim of art teaching is twofold: "to cultivate in the children sufficient skill to enable them to express their own ideas in some form of art, and also to stimulate the growth of such sympathy and sensitiveness as may lead eventually to æsthetic appreciation."* In the past, the executive, as distinct from the receptive, aspect of the artistic activity has been given undue pre-eminence in the course of instruction. This may be attributed partly to

* *Report of the Consultative Committee on the Primary School*. Board of Education. (H.M. Stationery Office, p. 189.) Vide also *Curriculum for Pupils of Twelve to Fifteen Years (Advanced Division)*, Scottish Council for Research in Education, University of London Press, 1931, Section VII, Art and Craftsmanship, p. 184. Aim, "To develop in the pupil a consciousness of beauty, the habit of acquiring and expressing knowledge in form and colour, and the practice of critical judgment in æsthetic products; to stimulate the creative impulse to Art, and improve construction by inculcating the idea that beauty and fitness for purpose are inseparable."

the original utilitarian purpose of 'art' education, as prescribed by the Department of Science and Art, and partly to the failure of educationists to observe the distinction between the productive and the receptive aspects of the artistic activity to which I have just referred.

(b) A long period of experimentation followed the introduction of 'art' instruction into the school curriculum. At first the course was very limited and, strictly speaking, could not be described as art instruction at all. The syllabus "took no note of the natural instincts and interests of children—being based upon that used for the training of adults engaged in industrial occupations."* Gradually, as educationists began to recognize the true nature of art and its significance in life and education, the aims of instruction were modified and extended. In the absence, however, of a sound theory of art education, and in deference to a stubborn conservatism, the old methods were continued, with various modifications, to meet the wider ideals. The main purpose of the course was to enable the pupil to represent with reasonable accuracy anything he saw. Despite the advancement of a more enlightened view of the artistic activity, representational drawing "at present occupies the first place in most schools for older scholars."†

IV.—ASSUMPTIONS UNDERLYING PRESENT THEORY AND PRACTICE.

Three main assumptions underlie present theory and practice in art education: (a) That all children are educable as graphic executants and that this is desirable; (b) that representational drawing supplies the disciplinary training in technical skill necessary for complete artistic expression‡; (c) that technical knowledge and practical experience are necessary for complete appreciation of art.§

(a) Regarding the first of these assumptions, it will generally be agreed that all children (excepting physical and mental defectives) are educable in a practical, artistic sense within certain limits, but as these limits depend upon the original endowment of the pupil, it is very doubtful whether continuous executive training, as presently understood,

* *Handbook of Suggestions for Teachers*, Board of Education, p. 270.

† *Ibid.*, p. 272 (ii). Vide also (a) *Circular* 30 (1932), Scottish Educational Department, p. 18, Section VII, Art. "Each course should be well balanced and should be based on a foundation of sound representational work"; and (b) *Curriculum for Pupils of Twelve to Fifteen Years (Advanced Division)*, University of London Press, pp. 189-190.

‡ *Handbook of Suggestions for Teachers*, p. 272 (ii). Representational drawing "supplies the technical skill which forms the practical basis of art."

§ *Ibid.*, p. 273. "Persons who have some degree of practical skill in any of the arts appreciate that art more fully than those who have none."

is desirable in all cases. It may be noted, first, that only a small proportion of pupils attending school will ever be called upon to create (graphically), and that only those specially endowed will create out of spontaneous impulse. In the second place, the present system of executive training, being based upon skill rather than art, does not, I submit, lead to the development of true ability in graphic art. And, in the third place, by giving precedence to these aspects of the productive artistic activity which are concerned with graphic processes, the present practice tends to overlook the true artistic and educational significance of craftsmanship. These objections point to a new conception of art education, which will provide greater facilities for the development of its receptive aspect, and for the inclusion of a greater amount of craft and handwork than present practice allows.

(b) With regard to the second assumption, that representational drawing supplies the disciplinary training in technical skill necessary for complete artistic expression, it cannot be admitted that this is a valid base upon which to found a theory of art education. The assumption is open to three main objections: First, that the type of technical skill developed by representational drawing is altogether different from that required in art. Technical skill involves (i) the manipulation of a medium and (ii) a motive or purpose. When the former is adequate to the demands of the latter, technical skill is functioning at its highest level of efficiency. In this sense it would be right to describe as a good technician a juggler whose manipulation of his material was adequate to his motive; but it would be wrong to describe him as a good artist. This is not to assert that the juggler may not be an artist, but his claim to this designation can only be upheld if his motive is to express an artistic purpose, and not to juggle, and only in so far as he successfully achieves that purpose. Similarly, a painter who manipulates his medium in order accurately to represent the visible appearance of an objective fact may be described as a good technician, if his manipulation of his medium is adequate to his representational purpose, but he can claim to be an artist only by abandoning his representational purpose and manipulating his medium in a manner which adequately expresses an artistic one. Thus the process of manipulating a medium towards the end of representation cannot be regarded as an exercise of the artistic activity, but a mere exercise of technical skill; and from the point of view of art education the exercise of the artistic mental power is fundamental. In the second place, representational technical skill can only secure literal transcription of what is *supposed* to be the visible appearance of objects; which is, properly regarded, not an artistic, but a scientific

achievement. I have italicised the word "supposed" because it has been experimentally demonstrated* that there is considerable divergence between what the eye actually sees and the shapes and sizes in plane projection which are determined by the laws of perspective. There is, therefore, no objective criterion of visible appearance. Representational drawing must accordingly be judged by mathematical standards (the spatial properties of the plane projection); and this, from the point of view of art education, is absurd. And, in the third place, the assumption is at variance with the evidence of history; in point of fact, it is refuted alike by Classic, Oriental, Gothic and Modern art. To indulge in a detailed argument here in support of this contention is unnecessary; the statement is justified by established historical fact. It is sufficient to point out that the history of Classic art shows that when representation became an end in itself, as in the Hellenistic period, the quality of art deteriorated. Oriental art has never embraced representationalism; and the finest manifestations of Gothic art are as far removed from representation as day is from night. Modern art likewise refutes the assumption. The naïve art of Le Douanier Rousseau,† who began serious painting late in life without any technical knowledge, in particular may be cited in justification of my contention that modern art refutes the æsthetic and educational theory underlying the teaching of representational drawing.

(c) The validity of the third assumption depends upon the meaning attached to the term "appreciation." In æsthetics this term is used in two not very clearly defined senses: first, with reference to the capacity to estimate or judge the work of art in the light of previous knowledge and experience; second, with reference to the capacity to derive æsthetic satisfaction and enjoyment from art, independently of previous knowledge and experience. The term is employed in a third sense, which partakes of both meanings, but this usage is so vague and unscientific as to render its discussion here impossible. In its essence, art appreciation is, as McDougall asserts,‡ "an attitude in which we are content to contemplate without belief or doubt; we accept and enjoy the appearance without enquiring into the reality of that which appears, just because the

* R. H. Thouless: "Phenomenal Regression to the Real Object." *British Journal of Psychology*, Vols. XXI, XXII.

† Le Douanier Rousseau (1844-1910) was at one time an excise officer. In his spare time he played the violin and painted pictures. When over forty years of age he gave up his post to devote the rest of his life to art. He "knew nothing of drawing as it was taught in the art schools, and nothing of impressionism," but "his hand did exactly what his mind, his spirit and his imagination willed" (R. H. Wilenski, *French Painting*, Medici Society, pp. 327-329).

‡ W. McDougall: *An Outline of Psychology*, p. 376.

appearance yields an immediate satisfaction Such an attitude is, I submit, psychologically incompatible with the intellectual process of estimating, judging, and criticising implied in the first and third of these usages. If this view be accepted, then the validity of the third assumption underlying the present theory and practice of art education cannot be admitted.

V.—‘DRAWING’ AND ‘ART.’

From the standpoint of art education, the distinction between ‘drawing’ and ‘art’ is of fundamental importance. As a consequence of the teaching practice of the past, the term “drawing” has acquired a meaning in everyday language which limits its application to representational drawing, as defined in Section II of this paper. In recent years, however, as a result of a change in fundamental ideas concerning the artistic activity, the course of instruction in art has manifestly altered. The introduction of imaginative drawing, design and craftwork has been an important forward step in the history of art education. But current practice, with its insistence upon representational drawing, suggests that educationists have not yet fully realized the true significance of the change in terminology now generally employed in educational discourse.* Contrary to current opinion, representational drawing is, I submit, neither a desirable nor an essential discipline for the attainment of artistic expression. Technical skill in art is not a matter of routine learning, but a personal quest and discovery of the means necessary for the expression of artistic feeling; and this can be developed only by the constant exercise of the artistic mental power. If my thesis is right, then what passes as art education at present is not true art education at all, but mainly (though not wholly), training in scientific technical skill.

* Witness (a) the fact that “drawing” is the official designation applied to the subject by the Board of Education (*Handbook of Suggestions for Teachers*); and (b) that “drawing and elementary art” is used in the *Report of the Consultative Committee on the Primary School* (1931), as if to draw a distinction between these two activities. While admitting the relevance of technical studies to art training, the committee is careful to issue a warning against possible dangers: “By training mere technical skill it is possible to foster the desire to draw, but it is essential that the art should remain within the child’s natural understanding and ability, and should not assume an artificial and sophisticated quality because undue emphasis is laid on technique” (p. 190). Again, in the publication *Curriculum for Pupils of Twelve to Fifteen Years (Advanced) Division*, issued by the Scottish Council for Research in Education (1931), the distinction between ‘drawing’ and ‘art’ is noted (p. 189), but the need for realistic representation is admitted, because it leads to the acquisition of “technical skill in various media and the development of appreciation” (p. 183; the italics are mine), and because “representational drawing is undoubtedly suited for school work, in that it is less affected by interruption . . . and further, it lends itself admirably to the compiling of full and orderly portfolios for presentation” (p. 189; italics mine).

VI.—ABILITY IN REPRESENTATIONAL DRAWING.

(a) Broadly speaking, there may be distinguished three main classes of executants, graded according to their representational drawing ability. In estimating this ability the criterion will be that of accuracy in representation, based on perception of the following characteristics :

- (1) Perception of the particular object or objects as distinguished from other similar objects.
- (2) Perception of the position of the object in relation to the observer and to other objects coming within the particular field of observation.
- (3) Perception of the precise character of the object or objects in respect of all these qualities (colour, texture, etc.) which distinguish it (or them) from other similar objects.

First, the lowest grade : those whose representations are so inferior as to render (1) and (2) impossible or extremely doubtful, and (3) definitely impossible. Second, the middle grade : those whose representations are sufficiently accurate as to render (1) quite certain, but (2) and (3) doubtful. This will be the largest group. Third, the highest grade : those whose representations are more or less accurate in respect of all three characteristics. As a certain amount of overlap is inevitable, these groups will not, in practice, be clearly defined ; but for present purposes the three groups may be taken as corresponding to the more general classification of poor drawers, average drawers, and superior drawers.

(b) It is self-evident that of the total number of pupils receiving training in representational drawing the ability of those in the lowest grade will not improve to any considerable extent by continued instruction and practice,* and that their drawings will have no practical value as representations of physical facts. With regard to the second grade, this group will be educable only up to the standard attained by the "average pupil," whose drawings are neither accurate enough to be of any practical value as representations, nor poor enough to be wholly devoid of representational value. But if, as I have submitted, representational drawing is fundamentally a scientific activity, it is obvious that there is not justification for the teaching of representational drawing to pupils whose productions fail to satisfy the practical test of scientific accuracy. And with regard to the third grade, the superior drawers, it may be

* This is not to deny that some improvement in technical skill may be produced by special training designed to remedy specific partial disabilities (for instance, disabilities affecting the motor-graphic or optical-perceptual processes), which may interfere with drawing ability ; but as the application of therapeutic methods lies outside the orbit of ordinary school work, the statement (and the one which follows it) may stand unchallenged.

pointed out that the only result to be gained by continued training in representational drawing will be more accurate representations.

(c) In his presidential address at the Conference of Educational Associations, Sir William Rothenstein said that "we are all equipped by nature to go as far as possible in some practical direction," and that he was doubtful "of the value of making all children draw or learn music."* As Sir William is a teacher of long and wide experience, his statement cannot be brushed lightly aside. For clearly a scheme of education which ignores the existence of a relatively uneducable class of executants, by insisting on making its members try to do something which, in virtue of the limitations of their natural endowment, they are unfitted, is wasteful and badly-founded. Indiscriminate insistence on executive work of a representational kind instils in many pupils a prejudice against art, which only a particularly happy set of circumstances can eradicate.

VII.—THE PSYCHOLOGY OF THE DRAWING ACT: AYER'S ANALYSIS.

Ayer has pointed out† that "the complete act of drawing is composed of two major processes which are quite distinct. It consists of an optical perceptual process and a motor-graphic part, each of which is composed of subordinate partial processes. In the optical-perceptual process the eye receives the sensory stimuli from the object in view, and the mind assimilates the perceived impression on the basis of previously acquired experience with sensory material. In the motor-graphic process the hand is set in motion to reproduce the perceived and more or less worked-over image of the original object." Analysing the optical-perceptual part of the drawing activity, Ayer distinguishes the following characteristics: (1) The purely optical process; (2) the sensational process; (3) the awakening of percepts which tend to be present and apperception; (4) assimilation; (5) secondary reproduction of earlier associations; and (6) preconceived observation. Three main characteristics are recognized in the motor-graphic part: (1) Drawing by optical image; (2) kinæsthetic control; (3) control by watching results. Ayer bases his observations on the experiments of Albein,‡ who emphasizes the fact "that the preceding optical-perceptual process of drawing varies individually in its composition, its components and the significance for the whole process"§—a fact which explains in part individual

* *Times Educational Supplement*, January 9th, 1932.

† Ayer: *The Psychology of Drawing*, p. 87.

‡ Albein: *Behalten und Wiedergabe einfacher Formen*, 1907.

§ Ayer: *The Psychology of Drawing*, p. 90.

variations in drawing ability. Accuracy in executive ability, therefore, may depend upon very varied factors. A child, for instance, whose optical-perceptual processes are highly developed might be a bad executant as a result of defects in his motor-graphic processes, and vice versa.*

VIII.—RECENT EXPERIMENTAL RESEARCH.

(a) Recent experimental research into the psychology of perception by Dr. Thouless, of Glasgow University, brings new evidence bearing on this point, which is of the very utmost significance. Dr. Thouless states: "If a subject is shown an inclined circle and is asked to select from a number of figures the one which represents the shape seen by him, he chooses without hesitation an ellipse. This ellipse, however, is widely different from the one which represents the shape of the inclined circle indicated by the laws of perspective, being much nearer the circular form. The subject sees an inclined figure neither in its 'real' shape nor in the shape which is its perspective projection, but a compromise between these."† Clearly to understand his experiments, it will be necessary to define Thouless's terms. By "real" shape he means "true physical shape"; "perspective shape" means the shape of the object in accordance with the laws of perspective; and "phenomenal shape" means the actually seen shape of the object. Thouless has been able to show by experiment that phenomenal regression applies to the perception of shape, parallel line, brightness, hue and size. "Under ordinary conditions of binocular vision, the actually experienced character of the object (or the 'phenomenal character') is a compromise between the 'real' character of the object and the character given by peripheral stimulation, whether this character is shape, relative size or relative brightness. In all these cases the phenomenal character shows a tendency away from the stimulus character towards the 'real' character of the object. As a general name for this tendency, in whatever kind of perceptual character it is found, we may use the term *phenomenal regression to the 'real' object*, or, more shortly, *phenomenal regression*."‡

Now, as the degree of phenomenal regression varies from one individual to another, it is obvious that a drawing which appears correct

* Meumann (*Experimentelle Pädagogik*) draws attention to the interesting fact that he found subjects possessed of excellent visual acuity and manual dexterity who could not draw.

† R. H. Thouless: "Phenomenal Regression to the Real Object," *British Journal of Psychology*, Vol. XXI, p. 339.

‡ *Ibid*, p. 343.

to one person may appear quite wrong to another. A pupil with a high index of phenomenal regression will draw a foreshortened circle (for example, a plate) much nearer the circular form than a pupil whose index is lower; and, it is important to notice, both indices may differ from that of the teacher.

(b) The laws of perspective, it may be noted, are not the laws of the ways we 'see.' Clearly, then, the usual devices adopted in teaching children to draw foreshortened figures not only do not teach them *to draw what they see*, but actually teach them to draw what, in all probability, they do not see. By employing such methods the child's drawing is "reconditioned to the stimulus object (perspective shape)* instead of the phenomenal object," which is the object he actually sees. From the point of view of art education the significance of the discovery of phenomenal regression cannot be over-estimated. Dr. Thouless himself appears to take an altogether too moderate view of the importance of his researches for art teaching.† "On the whole," he states, "there is probably sufficient ground for justifying the teaching of strict laws of perspective to those learning to draw. A simple set of rules is better than a complicated one. Moreover, the uncorrected tendency is to draw the phenomenal figure which is at the opposite extreme of error (if the object is realistic representation), and the combined effect of the uncorrected tendency and the learning of strict perspective rules may well result in a practically satisfactory compromise."‡ But, in point of fact, the teaching of perspective rules, at all events to school children, is probably not undertaken even by the most ardent advocates of representational drawing. The commonest method adopted is that of teaching the children to make measurements by holding the pencil or ruler out at arm's length and other similar devices, but the pupils are exhorted *to draw what they see*. Actually, however, the method is only of very limited practical value, because precise measurements are difficult to make by these means (the younger the child the greater the difficulty), with the result that in the long run the child trusts to his perceptions. Moreover, if we assume that the child does make accurate measurements and applies them to his drawing, the result may not look right to him, and if his index of phenomenal regression is very high, it will look all wrong. The psychological importance of this cannot be over-emphasized, because the first thing the teacher must do is to lead the child to have

* The brackets are mine.

† R. H. Thouless: "Phenomenal Regression to the Real Object, II." *British Journal of Psychology*, Vol. XXII, p. 28.

‡ Ibid, p. 29.

§ *Handbook of Suggestions for Teachers*, pp. 298-300, Sections 35 and 36.

confidence in himself and to believe in the rightness of his own efforts. Confusion will baffle him and engender diffidence and probably lead to strained relations with the misunderstanding teacher.

IX.—SUMMARY AND CONCLUSIONS.

(1) The aim of art education is twofold: to develop the means of expression by executive training and to stimulate the growth of such sympathy and sensitiveness as may lead to the appreciation of art.

(2) In the past the executive, as distinct from the receptive, aspect of art education, has predominated. This may be attributed partly to the original utilitarian purpose of 'art' education and partly to the failure of educationists to observe the distinction between the productive and the receptive aspects of the artistic activity.

(3) Despite the growth of knowledge concerning the nature of the art activity, representational drawing (the act of reproducing as accurately as possible on paper or canvas the supposed appearance of things as observed from a particular point of view) occupies the principal place in the present practice of art education.

(4) Three main assumptions underlie present practice: (a) That all children are educable as graphic executants, and that this is desirable; (b) that representational drawing supplies the technical skill necessary for complete artistic expression; (c) that technical knowledge and practical experience are necessary for complete appreciation of art.

(5) These assumptions do not appear to be justified. The principal objections are: first, with regard to (a), only a comparatively small number of pupils attain the standard of accuracy aimed at, and few are by natural endowment equipped with special graphic ability; second, with regard to (b), representational drawing develops a type of skill that is altogether different from that required in art; and third, with regard to (c), apart from the ambiguity of the term appreciation, there is no evidence to support the assumption.

(6) From the point of view of art education there appears to be no justification for the teaching of representational drawing. Based upon skill of hand and scientific observation, it is fundamentally not an artistic but a scientific activity. Literal accuracy can only be secured by scientifically analysing the visible appearance of things. As such a process is incompatible with artistic expression, representational drawing cannot be regarded as an exercise of the artistic mental power. The exercise of this power is considered fundamental to art education.

(7) The present insistence upon graphic execution tends to obscure the true æsthetic and educational significance of craftwork and the importance and value of promoting the development of appreciation by means other than practical training.

(8) These considerations point to the need for a new theory of art education and a new orientation of teaching method, that will pay greater regard to (a) the artistic and educational values of craftwork, and (b) the purely appreciative aspect of the artistic mental power.

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RÉSUMÉ

LE CRITÉRIUM DE LA FIDÉLITÉ DANS L'ART REPRÉSENTATIONNEL.

L'éducation artistique comporte deux aspects principaux, à savoir, l'exécutif et le réceptif. Dans le passé c'est celui-là qui prédominait. Dernièrement, cependant, on est venu à reconnaître l'importance de celui-ci. Mais, malgré la croissance des connaissances en ce qui concerne la nature de l'activité artistique, le dessin représentationnel (l'action de représenter aussi fidèlement que possible sur le papier, ou la toile, l'apparence supposée des objets, vus d'un certain point) occupe encore la place principale dans l'éducation artistique. La fidélité absolue ne peut être assurée que par l'analyse scientifique de l'apparence visible des objets. Puisqu'un tel procédé est incompatible avec l'art, on ne peut pas considérer le dessin représentationnel comme un exercice de la capacité intellectuelle, artistique, qui soit essentiel à l'éducation artistique. Basé sur l'habileté manuelle et sur l'observation scientifique ce n'est point une activité artistique, mais une activité scientifique, et l'exercice en est nuisible au développement de la véritable aptitude artistique.

ÜBERSICHT.

DAS GENAUIGKEITSKRITERIUM BEI DER VORSTELLUNGSKUNST.

Kunsterziehung hat zwei Hauptseiten, nämlich, die vollziehende und die empfängliche. Vorherrschend in der Vergangenheit war jene. Unlängst hat man aber die Wichtigkeit dieser anerkannt. Jedoch, ungeachtet der erweiterten Kenntnisse der Art des Kunstverfahrens spielt Vorstellungszeichnen (das möglichst genaue Wiedergeben auf Papier oder Leinwand des vermuteten Äusseren von Dingen, die von einem besonderen Gesichtspunkt gesehen sind) die Hauptrolle beim Unterricht in der Kunst. Wörtliche Genauigkeit kann nur durch wissenschaftliche Analyse des sichtbaren "Äusseren der Dinge zuwege gebracht werden. Da ein solches Verfahren mit der Kunst unvereinbar ist, so darf man die Vorstellungskunst als eine Betätigung des künstlerischen Geistesvermögens nicht betrachten, das der Kunsterziehung zugrunde liegt. Da die Basis davon Handfertigkeit und wissenschaftliche Beobachtung ist, so ist es wesentlich nicht eine künstlerische, sondern eine wissenschaftliche Tätigkeit und dessen Ausübung ist der Weiterbildung wahren künstlerischen Vermögens schädlich.

DISCUSSION ON MEASURING GEOGRAPHICAL PERSPECTIVE.

(A) BY H. EGGINK.

(B) BY E. J. G. BRADFORD.

(A)

WITH reference to Mr. Bradford's article in the November, 1932, issue of this Journal, I should like to put forward certain criticisms.

If I understand Mr. Bradford correctly, he asserts that :

- (1) Geographical relationships can hardly be regarded as logical in the narrower sense.
- (2) The main task of geography in schools is teaching "perspective." A locality is appreciated in proper perspective when a knowledge of its location will fix its position on the scale of gradations of any of the phenomena, the world distribution of which has been studied.
- (3) The pupils' insight into perspective increases little during their secondary school years.

Those who study the results of the tests set by Bradford will at once agree to the truth of (3) ; the question remains, whether the tests are right. Allow me to submit them to a closer examination. Tests B.1 and 3 refer to latitude and longitude and the map. Insight is not needed in this case, not even perspective—only a mental picture of the map. (In this connection we must remember that all our maps give incorrect distances.) In our schools, therefore, we only refer to latitude and longitude, in order to teach the pupils to handle the index at the back of the atlas. And we *measure* distances with the help of the scale ; memorising is superfluous. Suppose Bradford had asked what is the advantage of Mercator projection, would not the answers of the older pupils have been better than those of the younger ones ? And does he not agree with me that logical thinking is required for *cartographical* insight ?

Test B.2 proves as little : inquires into memorised knowledge. Why not a question about the *cause* of the greatness of London ?

Test C.1, 2, 3, refer to physical geography. One would expect to meet here with questions which enable the pupil to *find* perspective. This is hardly the case. In five minutes the pupils must call to mind a series of geographical phenomena, locate the point in question ; compare with others . . . and finally note down the results. This can only be

done if the facts have been memorised, which is impossible ; besides, Bradford does *not want* to test this.

What lots of factors are not wanted to determine the climate.

- (1) Situation in relation to (thermal) equator.
- (2) Height : the higher, the colder.
- (3) Situation on the windward or leeward side of a mountain (of influence on rainfall).
- (4) Situation in relation to sea, in which case the prevalent wind plays a part ; land winds bring extreme temperatures and drought.
- (5) For this construction of the wind, knowledge of the wind system on earth is necessary : equatorial depression, trade winds, etc.
- (6) Add to this the shifting of the wind system under influence of the variable solar declination, in consequence of which a place in lat. 34° N. (test C.3) is very difficult to locate for an intelligent pupil (unless he may use an isobaric map).
- (7) Sea-currents can be approximately constructed with the help of the wind system and the shape of the land continents ; they must be known as they influence the temperature ; cold sea-currents keep off the rain (S. Chile).
- (8) Situation in relation to adjoining expanses of land and water : monsoon-climate. Each pupil in the higher classes can *find* this climate, but he must have time to *think*.

In my opinion the very fact that there are so many factors to be considered—there are more than the above—point to a serious defect in Bradford's research ; as they often have a conflicting effect the " final mark " *may be the same in very different circumstances*. Besides—not even a meteorologist can give a mark. Are we justified, therefore, in concluding that geography does not require logical thinking ? A clever pupil is more likely to make a mess of this test in five minutes because he is not " neat " enough to simply guess the result.

Yet a good test might have been set here, provided the pupil has a good atlas at his disposal, giving altitude—isobaric and isothermic maps.

Or : a theoretical landscape may be constructed on which various factors, such as mountains, sea-currents, etc., are marked. If then the question is asked what influence the factors have, a better insight into the ability of the pupil will be obtained than is the case now.

Conclusion :

- (1) To understand and apply geographical phenomena, logical thinking is undoubtedly required.
- (2) Teaching perspective is certainly an important aim of geography.

- (3) Part of Bradford's tests does not measure perspective, but memorised facts.
- (4) The other tests are arranged in such a way and allow so little time that the results are worthless.
- (5) By means of a collaboration of geographer and psychologist, it would be possible to arrange better tests for the secondary school, undoubtedly in physical geography.

H. EGGINK (Amsterdam).

(B.)

DR. EGGINK'S criticisms arise from a difference of opinion about the place of memory and reasoning in school education. Thus conclusion 3 states "... does not measure perspective, but memorised facts." He and I are also at variance because he is valuing the tests as measures of ability, "a better insight into the ability of the pupil will be obtained," while I am proposing the tests as a means of searching for information that is fundamental to the development of an adequate perspective.

I have maintained that memorised information is the necessary basis for a true perspective. The learning process depends on the retention by the organism of past experience in the form of memories and skills. The first steps in education consist largely in acquiring memories and skills. Subsequent steps require the organizing of these memories into systems of thought, only some of which are logical in the narrower sense. In so far as geographical explanation is essentially a reference back to *graded* distributions, these graded distributions should be memorised—distributions of locations near and far : of temperatures high and low : of precipitations light and heavy.

To lump tests C.1, 2, 3, *together* and then to enumerate the factors influencing the *climate* of a locality is unjustifiable. Test C.1 refers to summer temperature only, and test C.2 to rainfall only. To know how much rain falls in a locality is of *first* importance, to be able to expose the relevant factors is of secondary importance. Conversation with the pupils tested elicited the information that they endeavoured to picture the distribution map when answering the question. A five minutes allowance was not felt by the pupils to be unduly short, because this method was adopted. The tests are not to be judged "worthless" on this account.

Conclusion 1 contains the phrase "to ... apply geographical phenomena. . . ." Behind such an expression can be hidden that pernicious belief, so stimulating to the pseudo-scientific teacher, namely, that logical processes are reversible. It may be logically sound to induce

a definite general principle from definite particular instances, but it is illogical to deduce definite particulars from a general principle. One can explain or expose *some* of the relevant factors that may have led to the establishing or to the growth of Groningen or Flushing, but one cannot legitimately predict that wherever *those* exposed factors are present, another Groningen or Flushing will be found.

An orderly reference to distributions is the very essence of geographical exposition, and pupils should be trained in such reference, which is logical in the wider sense of that term. Practice in such reference does not lead to a true perspective unless those distributions gradually become more and more familiar, *i.e.*, unless they are memorised.

E. J. G. BRADFORD.

REMEMBERING: A STUDY IN EXPERIMENTAL AND SOCIAL PSYCHOLOGY.

By F. C. BARTLETT, M.A., F.R.S. (Cambridge: at the University
Press, 1932. Pp. vii+317. 16s.)

PROFESSOR BARTLETT's volume is by no means to be regarded as just another monograph on memory. In more or less detail, it covers almost the whole of the cognitive side of mental life. Starting from memory as an activity midway up the scale, he shows that the processes of remembering are not sharply different from the lower processes of sense-perception or from the higher processes of constructive imagination and thinking. In fact, the theory of clear-cut mental levels comes to look almost as misleading as the doctrine of clear-cut mental faculties. Further, although he deals primarily with intellectual processes, Professor Bartlett is no mere intellectualist. Believing that psychology is a biological science, he adopts throughout a functional rather than a merely descriptive standpoint. His book is not a work on "memory" but on "remembering." He is not concerned to analyze or to catalogue what we recollect or what we perceive; his interest centres rather upon the conditions, upon the wide variety of conditions, under which recollecting and perceiving actually take place. Thus he continually insists upon the influence of non-intellectual or affective factors—on the interplay of appetites, instincts, interests, and ideals.

This unifying outlook, whereby all the details of our mental life are viewed as part of one consistent interacting whole, forms the most remarkable and the most suggestive feature of Professor Bartlett's work. As a result, his volume is by far the most important contribution to psychology that has appeared in this country during recent years.

Professor Bartlett relates the history of his experimental work. One bright May afternoon in the year before the war, the Psychological Laboratory at Cambridge was formally opened. As part of the demonstrations, Dr. Bartlett was invited to show in a darkened room a number of pictures, geometrical shapes and optical illusions to a long queue of inquisitive visitors. The remarks and interpretations were so various and intriguing that he thereupon commenced a series of systematic experiments proceeding along similar lines. He abandoned the "exact

methods of nonsense-syllables," which were introduced by Ebbinghaus and which have dominated work on memory ever since; and, adopting more natural and realistic material, tried to bring his study into closer relation with remembering in every-day life. This enables him to get away from the rather abstract and artificial conditions that so commonly obtain in the ordinary laboratory experiment, and brings his procedure nearer to that of the clinician.

He begins with experiments on perception. He shows his subjects, for a fraction of a second, various kinds of visible material. In the first experiments it consists of simple patterns and designs, made up perhaps of three or four lines only; in the second, a set of progressive patterns—patterns in which, throughout a series of successive views, the subject sees, as it were, one and the same design being progressively built up. He then proceeds to more concrete representations. And finally ends with reproductions of well-known pictures.

What are the results? With most observers (the trained psychologists seem often to form exceptions) the first reaction, on getting a glimpse of the material, is to treat whatever they see as a single unitary whole, with perhaps one or two features standing out in dominance. As a rule, the ordinary person does not take the picture or pattern item by item and methodically build up the whole; the first thing to emerge is an "attitude," often a feeling of surprise, familiarity, or dislike. He has an overmastering tendency to jump to a general impression, and on the basis of this guesses at the probable detail. His construction seeks, as it were, to justify his general impression, to satisfy or fortify his general attitude. As a result, the interpretation may at times go wildly astray. For example, after seeing a slide of Yeames' picture of *Hubert and Little Arthur*, one observer declared it showed "a woman in a white apron with a child by her knee." Another said it was "a representation of Othello saying to Desdemona 'Come fly with me.'" A third suggested "It might very well be 'The Woman taken in Adultery'"; subsequently, however, he thought the slide depicted Charles I and Henrietta.

The non-psychological are apt to suppose that, of all our cognitive reactions, the process of perception is one of the most simple and immediate, as it certainly is one of the most fundamental; yet these experiments reveal what modern psychology has long suspected, namely, that the process of perception is exceedingly complex. Indeed, perception appears at once to be the starting point of what are more commonly regarded as processes of memory.

Professor Bartlett's second set of researches deals with imaging. Here his experiments are based on the familiar device of looking at smudged ink blots, and seeing what can be made of them, much as one sometimes finds shapes in clouds or sees faces in the fire. The interpretations show a strong preoccupation with animals or human beings; but the most striking feature of all is their enormous variety. A blot which to one looks like a tortoise may seem to another to be two dead ducks and an ostrich; a third will declare that it is a dog worrying a table-cloth; and a fourth suggests a picture of Sohrab and Rustum from Arnold's well-known poem. The outcome is to throw into strong relief a process which Professor Bartlett points out occurs and recurs in every cognitive reaction—in perceiving, in imagining, in remembering, and in reasoning—namely, the effort after meaning.

The experiments on remembering itself are more extensive. In the first the subject is shown a series of picture postcards representing the face of a soldier or a sailor of varying rank: (it will be recalled that the experiments were started during the early days of the war when there was a widespread interest in the fighting services). After an interval, the subject describes the various cards in order, and answers questions about the details. At once it appears that accurate recall is the exception and not the rule. So long as psychologists worked primarily with nonsense-syllables, the very material employed tended to throw excessive stress on mere reproduction. Substitute material more akin to what we seek to remember in ordinary every-day life, and literal reproduction becomes as rare as it is unnecessary. The subject himself may be unaware of the changes and distortions. For example, the emergence of a memory-image may positively mislead the subject's recollection, while at the same time increasing his self-confidence: here, as in the case of actual perception, seeing, even with the mind's eye, appears to be believing. The main conclusion drawn is that "remembering appears to be far more an affair of construction than of reproduction."

In the second set of experiments, the subject is given a story or a drawing, and is subsequently required to reproduce it again and again at intervals of increasing length. The results are strongly suggestive of the way in which a rumour may arise on the basis of a simple fact, get gradually distorted, and then settle down in the shape of a fixed traditional legend. A further set of experiments employs the ingenious method of picture writing. The subjects learned to connect a series of hieroglyphs with the words they were supposed to represent; they were then to write from dictation a short story, inserting wherever they could, not words but the hieroglyphic signs. A number of instruc-

tive inferences are drawn, some of them quite unexpected. For example, a special determination to remember was often promptly followed by complete omission.

In the last set of experiments, a picture, a story, or an argument is reproduced not by one person but by a series. The reproduction of the first is handed on to the second; the reproduction of the second is passed on to the next; and so on progressively, until at length the final version, abridged, conventionalized, and variously transformed by a cumulative sum of minor modifications, emerges almost unrecognizable. The procedure will no doubt be familiar to many from the parlour game which is variously known as "Gossip" or "Russian Scandal." The process as a whole shows many similarities to the changes of popular stories as they pass from mouth to mouth, and a few striking differences. It is found that the cumulative recall of a very few people may result in the production of a totally new event or story. Chains of reasoning may entirely disappear. The final opinion may be exactly the reverse of the original statement from which it is derived.

The results of all these experiments are gathered together in a series of theoretical chapters. Professor Bartlett starts with a world of human beings confronted by an environment in which they can survive and succeed only so far as they can match its infinite diversity by an increasing variety of response and at the same time discover ways of escaping from the domination of what is actually present. Past experience is commonly said to operate by producing some change in the nervous system. Traces, after-effects, are somehow left upon the cortex of the brain. Professor Bartlett insists that this simple explanation is inadequate; for it is usually implied that the traces so left behind are inert, inactive, and individual, without any organization of their own. The re-excitement of brain-traces might suffice to explain the reproduction of nonsense words or of fixed mechanical habits. But in actual life what seems to operate and persist is rather some active, developing pattern, some form of arrangement, which is not rigid, self-contained, and unchanging, but is itself a living organization of past reactions and experiences. Borrowing a term from Sir Henry Head, Professor Bartlett speaks of these organized patterns as *schemata* or *schemes*.

In a simple creature, real or pre-supposed for text-book purposes, the fixity of habit tends to suggest that the past affects the present by forcing the creature to repeat old sequences, in a stereotyped chronological order which cannot readily be broken. For the higher and more complex organism, therefore, the problem is this: how to resolve the

original scheme into its elements, and so transcend the original order in which those elements occurred. This problem, according to Professor Bartlett's view, can be solved solely by the aid of consciousness. It is a problem which gives to consciousness its pre-eminent function. Through consciousness the organism is enabled "to turn round upon its own schemata and make them the objects of its reactions."

To overcome the difficulty, the method of images is first evolved. "Images are a device for picking bits out of schemes, for increasing the chance of variability in the re-construction of past stimuli and situations, for surmounting the chronology of presentations." Thus, in any process of recall, images (as the experiments reveal) are particularly liable to arise when any slight check occurs: the typical case for their occurrence is "the arousal of cross-streams of interest."

The device of images, however, possesses several deficiencies. Of these, two are singled out as especially important. The image, and in particular the visual image, "is apt to go farther in the direction of the individualization of situations than is biologically useful"; and the principles of the combination of images have their own peculiarities and "result in constructions which are relatively wild, jerky, and irregular, compared with the straightforward unwinding of a habit, or with the somewhat orderly march of thought." As Professor Bartlett rightly points out in passing, the familiar forms of association—the principles of contiguity, succession, and similarity, a logical classification mainly derived from the analysis of word-associations—are not sufficient to describe the peculiar modes in which images combine. These latter modes seem at bottom to be dependent on the special conditions that determine the combination, not of words or of ideas that are verbally expressed, but rather of interests and attitudes.

The defects of the image, therefore, are met by the later device of words. Words no doubt arise under social pressure. They are explicitly analytic—far more analytic than images. They can be used not only to describe particular features but also to indicate the qualitative and the relational factors in the general aspect. Hence to some extent they tend to compensate for the extreme particularity of the image; and thus, in Professor Bartlett's experiments, they often appear as an alternative form of recall. They are, in fact, the best of all human inventions for perfecting reaction at a distance, and are essential to all the higher processes of thought.

The second part of Professor Bartlett's book deals with remembering as a study of social psychology. Here he discusses the process of con-

ventionalization and Jung's notion of a collective unconsciousness ; and so adds to his views on individual memory an examination of the basis of social recall. This portion of the work embodies some first-hand observations upon social recall among the natives of Swaziland ; but it would be impossible in a single short review to do justice to the suggestive views put forward or to the penetrating things said by the way. It must be sufficient to add that here again Professor Bartlett has struck upon a field and a method of investigation which have hitherto been neglected by the psychologist, but which, as he clearly demonstrates, should yield results of theoretical value and possibly of great practical importance.

CYRIL BURT.

ERRATA IN ARTICLE ON
INTERESTS AND MOTIVES FOR STUDY AMONG ADULT
EVENING STUDENTS.

VOLUME III, PART 1.

- Page 15. Table for question 9—for 15% read 12%.
Page 15. Table for question 10—for 34% read 36%.
Page 15. Table for question 11—for 82% read 88%.
Page 16. Line 6, for 82% read 88%.

BOOK REVIEWS.

Education and the Social Order: By BERTRAND RUSSELL. (Allen and Unwin. 254 pp. 7s. 6d.)

One takes up a work by Bertrand Russell with a confidence that it will at least not be dull, and with this particular book again no disappointment of that kind occurs. The book is, as the publishers' cover states, brilliant, stimulating and controversial.

As the title indicates, the author deals chiefly with those aspects of education which are intimately associated with the point of view of social philosophy and social organization; though in the earlier chapters, such as that dealing with discipline in education, the treatment is more definitely psychological and has relation to method in the educative process; and these chapters are fundamental.

In these earlier chapters, Lord Russell on the whole expresses quite moderate views in reference to freedom in education. On the other hand, this earlier part of the book is sometimes open to the charge of dogmatism and unproved assumptions; a curious charge it may seem in reference to Bertrand Russell, the keen advocate of rationality and scientific approach.

Possibly, however, some readers will not be struck by this particular weakness. For it seems that if a man first wins a wide reputation as an authority in some branch of science, then, when he talks dogmatically upon education or other topics in which scientific demonstration is difficult, people are apt to accept his dogmatic statements as being as dependable as the strictly scientific investigations on which his reputation was based.

In this book it is in reference to psychological matters that the assertion of unproved dogmas are most evident; for example, that *all* training should have the co-operation of the child's will (p. 40). The assumption of a *general* capacity for concentration upon any matter in which one is not interested is another example of a supposition the evidence of which is not suggested. Other significant phrases are "unconditioned reflexes which have replaced instinct," and again "The affection given by adults should be such as to cause a feeling of safety, but not such as to limit freedom or to arouse a deep emotional response in the child" (p. 62). No reason is given to justify this statement that the affection of adults should not arouse a deep emotional response in the child.

To leave the psychological point at the moment, Russell asserts that certain instances "suffice to illustrate the fact that Church and State are implacable enemies of both intelligence and virtue" (p. 72). Such sweeping statements do not make Russell's arguments more convincing, at least to the more thoughtful reader; but of course to add "at times" would make the paragraph so much less stimulating.

In dealing with the relation between heredity and education, Lord Russell suggests that the views of some writers on heredity are coloured by their political views. This suggestion of unconscious influence could surely be turned upon the author himself, for his extreme scepticism as to the evidence for the hereditary transmission of intelligence might suggest that he himself is unwilling to believe that the poorest classes, are, on the average, less intelligent. He reveals no knowledge of recent work on this particular subject, and indeed the absence of all references to evidence of many assertions made in the text is a grave weakness of the book.

A further characteristic is the frequency with which the writer uses such phrases as "not infrequently the child," "the majority of children," etc., without giving again any statistical evidence for the assertion. One can only conclude that Lord Russell is basing these assertions upon his own necessarily limited experiences. On the whole, Russell's references to psychological points confirm the impression that I got from his earlier book *On Education*, namely, that he too readily jumps to psychological assumptions without familiarity with the evidence which is available. The best example of this is to be found in his earlier book, when he suggests that his own tendency to suicide during adolescence was due to

his solitary education. Now enquiries show that about forty per cent of university students report suicidal tendencies during adolescence, though of course only a negligible proportion of university students have had a solitary education.

I have dwelt somewhat disproportionately upon the earlier chapters of the book and psychological aspects, because they seem to me fundamental even to later portions of the book. In these latter chapters Lord Russell deals with such questions as patriotism in education, class feeling and competition in education, and education under communism. "Communism," he maintains, "offers a solution of the difficult problem of the family and sex-equality—a solution which we may dislike, but which does, at any rate, provide a possible issue. It gives children an education from which the anti-social idea of competition has been almost entirely eliminated."

In conclusion, to the reviewer the book appeals as one providing valuable suggestion and stimulation in thought on education rather than as a genuinely scientific exposition. One can only regret that Lord Russell, with his great mathematical and philosophical abilities and training, followed by his practical excursions into the work of teaching and the running of a school, should not have provided a more searching and reliable enquiry into the complex problems of education; and yet for many students of education, the dominant feeling as this book is put down will, I imagine, be one of gladness that a man like Bertrand Russell should come to the conclusion that education is the subject and the work to which it is best worth while devoting his remarkable gifts and opportunities; and some of the types and concepts of education against which he fights still exist, and still need fighting. C.W.V.

Occupational Misfits: By SHEILA BEVINGTON. (Allen and Unwin. Pp. 97+Appendix and Index. 6s.)

This is described as a comparative study of North London Boys Employed and Unemployed. The investigation was carried out in Tottenham for certain very definite reasons. The investigator mentions that the Tottenham Bureau has not been so long in existence as some other London centres; without comparative statistics it is impossible to say how the Tottenham boys' case compares with others in London, but the author gives some results which indicate that the work of the Bureau is mostly uphill and that much has yet to be done by all the other agents ordinarily responsible for advising boys about the occupations they should seek on leaving the elementary schools.

It is remarkable how little the schools *appear* to contribute to the social service of acting as agents for placing boys in suitable occupations. This is hardly to be considered as the fault of the schools. It takes a long time to get an established connection between schools, offices, works, etc., and teachers must not butt in where their help is not asked for. The schools may be able to do more in time; that which is more serious is the apparent inability or disinclination of some parents to guide their sons towards suitable occupations on leaving school. Urgent problems are raised in this connection. While it is true that a number of boys get aid from their parents, the size of family seems to be associated directly with unemployment. Then there is the problem of aimlessness. Those who drift into unemployment are those whose school records are of low order and whose families are poor.

Here are but a few of the points arising in the course of this interesting investigation. In its conclusion Miss Bevington suggests some valuable remedial measures, among them being the advocacy of specially trained careers masters. It is an obvious course to improve the means for advising parents and extend the function of the school in regard to vocational choice; what is possible in a few instances ought to submit to expansion and wider application with the intention of adjusting an equilibrium which has been disturbed by modern labour conditions.

This research is of high social importance. The method is clear, and although some criticism may be made in the arbitrary award of marks for estimating averages (see p. 34), the matter is a small one. What is more important is that the conclusions are most valuable and worthy of serious attention, not only in Tottenham but generally throughout the country. A.P.B.

The Proper Study of Mankind: By B. A. HOWARD. (Ginn and Co., Ltd. Pp. 256. 3s. 6d. net.)

This little book, by the Headmaster of the Addey and Stanhope School, New Cross, is an attempt to solve one of the most pressing problems of secondary school work—that of the Sixth Form. "The official curriculum," as Mr. Howard says, "does not correspond as closely as it should to the real needs of our pupils. It fits the examination system very nicely; that is what it was meant to do; it does not altogether fit the needs of boys and girls who have lives to live as well as examinations to pass." The difficulty of course lies in specialization; this cannot be avoided; but complete ignorance of what lies outside one's special subject can and must be avoided. Mr. Howard's remedy is to give his Sixth Form pupils a series of talks, followed by lengthy discussion, on "the broad facts of human life . . . which, while covering a wide range of topics, would relate those topics to each other in such a manner as to create some sense of the unity of knowledge; and which would have a definite bearing upon the attitude these pupils would adopt to the problems of citizenship confronting them when they leave school." There can be no question of the importance of such studies. We have bleated enough about the need for an "educated democracy" without always endeavouring to provide the sort of "education" that the phrase implies: the ordinary school subjects can easily fail to give it. Mr. Howard's book contains just the material and the outlook that are wanted. Its contents have been tried out, modified, and re-arranged before publication: the course has been proved to be workable. Naturally such a book will not suit other teachers in every detail; the author would be the last to expect that. But it is certainly suggestive; and it is to be hoped that it will set many teachers on the track of working out similar courses for themselves and their older pupils. But for those who wish to follow his course Mr. Howard has written a useful pamphlet of notes for teachers. From its nature, as forming a basis for discussion, the material of the book need not be reviewed; it is however interesting to read through; it contains lists of books for further reading; and it is well informed, though in passing one may question the importance given to the astronomical theories of Pythagoras. It should be of real value also in adult education, particularly for the work of educational settlements. Altogether it is a work which may have salutary and widespread effects on English education.

F.A.C.

The Social and Emotional Development of the Pre-school Child: By KATHERINE BARHAM BRIDGES. (Kegan Paul. Pp. 273. 12s. 6d.)

This is a valuable study of a pioneer type, constituting an attempt to set up a development-scale in reference to the social relationships of children, and in reference to their emotional development. The behaviour of young children from two to five years of age in the McGill University Nursery School was observed over a period of three years and a scale drawn up from the various items of behaviour and emotional reactions to a given situation. The author is very cautious in limiting the results of her observations to the particular conditions under which they occur. She points out, for example, that the scale is not necessarily applicable to children of the same age under conditions of a different school or of the home. It does, however, provide a means of comparing one child with another within the same school conditions.

An interesting theory of the development of emotion from a primitive general excitement is included. References to sex differences and the special characteristics of only children are unfortunately based on far too few examples to be of much value. For example, there were only ten "only children," and eleven boys and ten girls of the same average age.

The book is very clearly written and admirably illustrated with a large number of photographs. Altogether it constitutes a most useful contribution to the study of early child psychology.

C.W.V.

The Energies of Men, by WILLIAM McDUGALL. (Methuen. Pp. 395. 8s. 6d.)

In this new work, Professor McDougall gives what he calls a simplified condensation of his two large volumes "An Outline of Psychology" and "An Outline of Abnormal Psychology." This book, however, is something more than that, for it indicates a further stage in the development of McDougall's thought, or at least it reveals an adoption of a terminology which, in the opinion of the reviewer, removes some of the main difficulties in McDougall's earlier expositions and adapts his writings more both for study by the general reader as well as by the student. I refer chiefly to his abandonment of the term "instinct" in reference to many of the human dispositions and the adoption of the word "propensity."

Giving as it does within a relatively small compass, the gist of the rich body of thought which McDougall embodied in his two larger volumes, and marked by that clarity of style and interesting exposition which we have learned to expect in McDougall, this should prove a most valuable book for the student, particularly for beginners in psychology. The title of the book indicates itself certain limitations. McDougall, here as elsewhere, is much more interested in the fundamental motive forces within man than he is in details in reference to cognitive processes, such as memory, the learning process generally, images, association, and so forth.

The sub-title of the book—the Fundamentals of Dynamic Psychology—indicates its main trend, and after an approach to the preliminary study of the schools of psychology, McDougall proceeds to discuss the simpler forms of mental life, the behaviour of higher animals and so forth, and then applies the comparative method to the native endowment of man. The later chapters deal with feeling, emotion, sentiment and generally with that side of psychology to which McDougall has made such valuable contributions.

For the general student of psychology the work needs to be supplemented by one on experimental and general psychology dealing with thought and with cognitive aspects generally; but the book is most welcome as a general exposition of McDougall's views.

The Evidence of our Senses: By A. W. P. WOLTERS. (Methuen's Monographs on Philosophy and Psychology. Pp. 88. 2s. 6d.)

This is a little book giving an exceptionally clear description of what is understood by "Perception." The space at Mr. Wolters' disposal has been small, but he has balanced the treatment of his subject so nicely between the practical and theoretical aspects as to produce a statement equally useful to the thorough-going study of perception as for the use of those who want merely a simple explanation.

Mr. Wolters has avoided the defect of allowing his account to become academic, but he has kept the scientific treatment well in hand, and has brought it well up to date, as, for example, in his treatment of the opposed views of Spearman and the Gestalt School.

Two chapters of the book, viz., "The Eye Witness" and "Scientific Observation," appear to call for special commendation on account of the light they throw on some of the common problems of perception. A.P.B.

The Mind of the Child: By CHARLES BAUDOUIN, translated by EDEN and CEDAR PAUL. (London: George Allen and Unwin, Ltd. Pp. 282. 10s.)

This is a translation of "L'Âme Enfantine et la Psychanalyse," reviewed in this Journal, Volume II, Part 3, page 361, to which we would refer readers.

We may add that this volume is admirably produced and the names of the translators are sufficient indication of the value of the translation.

The Year Book of Education for 1933: Edited by LORD EUSTACE PERCY.
(Evan Bros., Ltd., 35s. Pp. 860).

This Year Book, first issued in 1932, is unique among year books, as regards its constitution. The second volume is not merely the bringing up to date of material previously given in the first volume, as is usual in year books, it is rather the extension and development of the material given and the problems raised in the first book. The volume for 1932 was more in the nature of a summary of facts of the existing educational system of the country. Some of the material there has been supplemented in this volume by the bringing of statistical reports up to date. The rest consists of essentially new material.

In the first place Lord Eustace himself contributes a valuable survey of the events in education in the United Kingdom during 1932. Here he takes his usual broad outlook and sees things with a remarkable sense of proportion.

The next section of the book gives statistics bringing information in the earlier volume up to date; then follows a section dealing with finance in education in the United Kingdom, not merely the finance of the year, but including a survey by the editor of ten years' expenditure in England and Wales.

Section III is an important part dealing with the structure and law of education in the United Kingdom, while the large section which follows deals with educational policy and method in relation to modern needs. A selected number of important present-day problems are dealt with here, such as education for industrial vocation, treated by Lord Eustace himself, and critical surveys of various aspects of education, including a discussion of the Dalton plan in this country. Space does not permit me to give an indication of the many varied topics dealt with in the rest of the book, but I may refer particularly to the treatment of universities by Sir Charles Grant Robertson, of Vocational Guidance by Dr. Macrea, and the substantial section dealing with education in the Dominions and Colonies.

Altogether this Year Book, if it be continued, as we presume it is to be continued, gives promise of becoming in itself almost a library of reference for students and practitioners of education. Apart from the pleasure that one feels at finding one of our most eminent younger statesmen taking such a keen interest in education continued even after a term of office as President of the Board of Education, one must congratulate him on the useful piece of work which he has accomplished in these two volumes.

C.W.V.

A Headmaster Remembers: By GUY KENDALL. (Victor Gollanz, Ltd.
8s. 6d. 320 pp.)

To all interested in education and to lovers of a good autobiography this should be a delightful book. The Headmaster of University College School, Hampstead, has written in a leisurely, reflective way about his own education, and about his later active life as a teacher. Throughout the book there are also scattered freely sketches of interesting and influential people in the educational world. The descriptions of Eton under Warre, and of Magdalen College, Oxford, under Warren, are living pictures. Most valuable of all to a student of education is the study of the practical work of the public schools whether boarding or day, as seen by such a keen observer as Mr. Guy Kendall. It is fascinating to see the development of a broader and more humane attitude towards the education of boys in the mind of one educated on very conservative lines.

There are many points of interest for a historian of education; we get, for example, a delightful glimpse of the beginnings of a development of the "modern side" in the public schools. Of one of these modern forms he says, "Perhaps even more than most 'modern sides' of the time, the C form was regarded as a sort of 'sink,' an outer darkness which no self-respecting scholar would enter if he could help it" (p. 180).

Mr. Kendall has his own decided views, and yet he is never dogmatic; one always gets the impression of a mind awake to suggestions, responsive yet critical, very conscious of the complexities of educational problems. Altogether this is a most welcome volume.

C.W.V.

Art and Artistic Handicrafts: For the Infant School, 1 Vol.; for the Junior School, 1 Vol.; for the Senior School, 1 Vol (Book I); for the Senior School, 1 Vol. (Book II); by ARTHUR B. ALLEN, L.C.P. (Harrap.)

These handsome quarto volumes of from 200 to 300 pages each cover a wide field in dealing with all varieties of art and craftwork for children of different ages.

The foreword by Mr. Cyril Burt emphasizes the importance of the right kind of teaching in the arts and crafts for a complete education, and the author endeavours to show how this may be achieved. The work is planned on a sound psychological basis; he recognizes the difficulties for teacher and pupil, and gives wise guidance for both. The problem of the syllabus is well treated, suggestions for typical lessons are good, and there are illuminating chapters on the possibilities of correlation between art and craft and other subjects of the curriculum. The suggestions for constructional models in this connection are excellent, and the chapters on the theatre, tent-making and masks should find a welcome in many schools.

The books are generously and well illustrated throughout. It is not to be expected that any one writer can deal equally well with every one of a large variety of activities. In the case of many crafts, Mr. Allen has been content to indicate possibilities and create an interest, leaving the teacher to make use of the bibliography he wisely appends to each section. Needlework, cane basketry, pottery, are crafts which are thus briefly dealt with, and one feels that perhaps some of the less important, and more "temporary" kinds of work might have been omitted in order to do better justice to some of the major crafts. Mr. Allen is less happy in his suggestions as to suitable design for leather work and for stencil decoration than in the other parts of the work.

These volumes can be recommended as written in the right spirit, brimful of hints and suggestions for the intelligent teacher, and likely to be a useful addition to the school library.

Latin for To-day: By M. D. GRAY and T. JENKINS, edited by C. McEVoy, M.A. (Ginn and Co., Ltd. Pp. 327. 3s. 6d.)

This book is the result of the application of serious thought to the special position of Latin to-day in competition with the many other subjects of the crowded curriculum.

It has in view especially pupils who are likely to do no Latin after reaching School Certificate stage, and it seeks to make the subject more attractive to them and more valuable. One way in which this is done is to emphasize throughout the inter-relation of Latin and English with a view not only to helping the Latin studies forward but to widening the English vocabulary and giving a clearer grasp of grammatical principles underlying English.

Another characteristic of the book is that an attempt is given, even at this elementary stage, to give the pupils some idea of Roman life and traditions. The illustrations are frequent and excellent and have a close bearing on the subject matter. Indeed the method employed in the book is to some extent a blend of the direct method with a more traditional method. The growing objection to the pressing of Latin upon large numbers of pupils who have little ability or interest for it would be appreciably lessened by the use of a book of this kind, and we commend it warmly to the notice of teachers interested in the method of teaching Latin.

Ancient Education and its Meaning to Us: By J. F. DOBSON, M.A. (Harrap, "Our Debt to Greece and Rome." Pp. 205. 5s.)

Gives a clear outline of practical means of instruction in Sparta, Athens, and Rome. It discusses the theoretical aspects of Education as set out by Plato, Xenophon, Aristotle, Isocrates and Plutarch, Cicero and Quintilian. There is a short chapter on the development of schools under the Roman Empire, and an

account of methods and curriculum in the Middle Ages makes a link with the concluding chapter which fulfils the purpose of the book's title.

This little work is a worthy addition to the series. It is not pedantic at all ; it is stimulating and creates a definite atmosphere in which the persons who are mentioned, live, move and teach (either directly or indirectly), in a manner such as will appeal to many for whom history has so often been dull and uninteresting.
A.P.B.

FOREIGN JOURNALS.

Zeitschrift für Pädagogische Psychologie: February, 1933.

Else Liefmann deals with the intellectual and physical capability of "Repetenten" in the elementary school. Repetenten, repeaters, are those who fail to get promotion, and are left to repeat the course for another year. The observations refer to Freiburg, which has not got the same system of coaching-classes (Förderklassen) for the retarded that has been recommended from Mannheim. Hence, with some 122 children aged about ten, were 15 older children condemned to repeat the whole year's course. The children did not come from the very poorest quarter of the city, but the "repeaters" showed some physical handicaps. The authoress is rather emphatic about the dulling effect of this repetition year. These children tend to stupefy and lose all feeling for their situation ; their failure lies on them as a dull pressure of incapacity, and limits beforehand every performance.

Otto Lipmann criticizes results already published about promotion statistics in Prussia. Gifted children may pass on to higher schools after three years or more, generally after four years, in the elementary schools. Ingenious diagrams display the later school course, for 1,000 "Vierjährige," compared with 1,000 "Dreijährige" children. Of the four-year group, some 220 in the 1,000 fail to make good and fall out by annual instalments of about 5 per cent. during the four years after promotion, whereas from the first creaming, the three-year group, the wastage is only 47 per 1,000, or about 1 per cent. per annum. The Dreijährige are, however, only some 2,000, as compared with some 45,000 Vierjährige. There is no proposal to promote all children at the end of the first three years.

Zeitschrift für Pädagogische Psychologie, 34 Jahrg, Nr. 3, March, 1933.

Includes an article on examples of character reports on scholars (Schülergutachten), by Helmut Aschenborn. The Rhineland school council has directed attention to the poverty of school reports, which are often valueless. Official exhortations produce little improvement, so long as reports are not turned to good account beyond occasional use in doubtful cases of matriculation pass. Some specimen character pictures are reproduced ; the only aim in their composition has been fidelity to nature. They concern seven out of fifteen scholars in Oberprima (= Upper Sixth) of a real gymnasium. We give one report of special interest to English readers. It concerns B, a boarder. B's character reads :—

"The main features of his nature are an inheritance from his English mother. A steady quiet will, a sober unimaginative world of thought, a sure instinct for the attainable, a ready responsibility of social feeling, and finally, a child-like, frank, warm-hearted disposition mark his English nature. The morbid, uncontrolled father, an officer, through his narrowly conceived old Prussian conception of education, has driven his son to obstinate defence against him, and completely under the influence of the mother. This refractory independence prepared many school difficulties for the lad in the middle years of development, and can still to-day rear up against a compulsion which he does not understand. On the other hand, he is easily led by those in whom he has confidence. He seeks such confidence from adults, although he hides his need of support and help behind a self-confident advance. He deserves confidence by his unconditional trustworthiness and his delicate modest discretion ; he rewards it with open-hearted communicativeness. . ."

PRE-COLLEGE TEACHING EXPERIENCE AND
OTHER FACTORS IN THE TEACHING SUCCESS
OF UNIVERSITY STUDENTS.

BY ARTHUR PINSENT.

(*From the Department of Education, University College, Aberystwyth.*)

PART II.

- I.—*Effect of pre-college experience on academic record.*
- II.—*Selective effect of pre-college experience with respect to factors measured by intelligence test.*
- III.—*Effect of pre-college experience on achievement in professional theory examinations.*
- IV.—*Presence of sex differences in relation to professional training.*
- V.—*Prediction of teaching success at the end of the professional year.*
- VI.—*Summary of results and conclusions.*
- Appendices: including summary of some American enquiries.*

I.—HAS A PERIOD OF PRE-COLLEGE TEACHING EXPERIENCE AN ADVERSE
INFLUENCE UPON ACADEMIC RECORD?

IN Part I of this report it was found that uncertificated teacher experience obtained before entering college did show a significant connection with teaching grade in the professional year in the case of men students. The question now arises—is the improvement obtained at a disproportionate cost in terms of academic retardation. What effect has the break between secondary school and college upon the final academic status achieved? In this connection the U.A.* and the S.T.* experience are not quite comparable. In the first place the U.A. is teaching the whole time and has to do what study he can by his own effort and guidance. The S.T. usually spends one day a week in the secondary school, during which time he has an opportunity for some private reading and comes into contact with the masters with whom he may have worked during

* U.A.=Uncertificated Assistant.
S.T.=Student Teacher.

his school life. Secondly, the U.A. is responsible for the class he is teaching and his whole time is occupied by the work. More of his energy is absorbed therefore than is the case with the typical S.T. who helps the head, or some senior teacher, and who spends a good deal of time in observation and in routine occupations. It is likely therefore, that, other things being equal, the U.A. will have less time and energy to spare for his academic preparation.

It is difficult to get any adequate measure of academic achievement. For the purpose of this section the highest level achieved in the final degree examinations, and the time taken to arrive at this result, have been adopted as the most important characteristics. The final result in the degree examinations is the measure used to assess academic ability by the general public, including the appointing bodies, and it is this test which will be of the most importance for the young teacher in his attempts to obtain a permanent post. In order to get a rough numerical scale of academic values the following table of equivalents has been used :

<i>Academic result achieved.</i>	<i>Points allotted.</i>	
	<i>If obtained in 3 years.</i>	<i>If obtained in 4 or more years.</i>
Ist honours	80	80
II (a) honours	70	65
II (b) honours	60	55
III honours or three final courses.....	50	40
Two final courses	45	35
Partially complete degree scheme.....	25	
Short course students eliminated at end of first academic year.....	10	

The distribution shows a significant relation between teaching experience and academic record for both men and women students. The scatter diagrams indicate a skew tendency and the correlation ratio between these two factors was found to be :

$$r = .36 \pm .03 \text{ (men) ;}$$

$$r = .30 \pm .03 \text{ (women).}$$

That is, the period between secondary school and college studies affects the academic record adversely in this sample taken as a whole. Analysis of details reveals, however, that the effect is restricted within certain limits.

From Table I it appears that most of the short course students, i.e., students who fail to complete three academic courses (usually of the first or intermediate grade) in the first academic year, are included in the twelve months S.T. group, actually twelve out of sixteen such men, and sixteen out of twenty-four women. These students bring down the academic record of their group considerably, so a separate table has been made eliminating their results (Table II). For our purpose the most interesting sections of the table are those which include the good honours degrees and the academic failures. These have been abstracted in Table II.

TABLE I.

SHOWING PERCENTAGES OF ACADEMIC GRADES IN VARIOUS RANGES OF PRE-COLLEGE EXPERIENCE.

<i>Pre-college Experience.</i>	<i>No. of Cases.</i>	<i>Academic Grade.</i>											<i>Mean Points.</i>	<i>% of I and Ia Hons.</i>	<i>% 40 pts. or below.</i>
		80	70	65	60	55	50	45	40	35	25	10			
MEN :															
All U.A.'s	68	10	12	6	7	3	7	21	10	4	15	4	49	28	33
12 months U.A. ..	52	12	10	8	8	4	6	25	12	4	12	2	50.9	30	29
12 months S.T.	112	11	7	7	5	3	5	17	9	13	12	11	45.5	25	45
Nil	206	14	15	9	9	8	6	8	11	10	10	1	53.8	38	32
Total	398	12	12	8	8	6	6	13	10	10	11	4	50.7	32	35
WOMEN :															
All U.A.'s	17	—	12	18	—	—	6	12	18	6	18	12	42.7	30	54
12 months U.A. ..	13	—	15	8	—	—	8	15	15	8	23	8	41.9	23	54
12 months S.T. ..	94	5	9	—	11	1	9	19	6	14	10	17	41.5	14	47
Nil	244	8	19	5	14	6	10	11	10	11	4	2	53.5	32	27
Total	362	7	16	4	12	4	9	13	9	11	7	7	49.6	27	34

TABLE II.

SHOWING THE PERCENTAGES OF GOOD AND POOR ACADEMIC RECORDS IN CERTAIN RANGES OF PRE-COLLEGE EXPERIENCE AFTER THE SHORT COURSE STUDENTS HAVE BEEN ELIMINATED.

Pre-college experience.	No. of cases.	Academic Grade.							
		80	70	65	All hon.	40	35	25	All poor.
MEN :									
12 months U.A.	51	12	10	8	30	12	4	12	28
12 months S.T.	100	12	8	8	28	10	15	13	38
Nil	205	13	15	9	37	11	10	10	31
WOMEN :									
12 months U.A.	12	—	17	8	25	17	8	25	50
12 months S.T.	78	6	10	—	16	8	17	12	37
Nil	239	8	19	5	32	10	11	4	25

The twelve months U.A. group of men compare very favourably with the inexperienced group, producing slightly less proportion of good honours, more particularly IIa hon., in three years, but at the same time they show no significant difference in the proportion of failures. The twelve months S.T. group of men show the worst academic record apart from the I hon. grade. They have the least proportion of high honours men and the greatest proportion of failures amongst the men students. Even after the elimination of the short course students (see Table II) the twelve months S.T. group still show the greatest proportions of academically weak men.

The women show conspicuous differences as between the experienced and inexperienced groups. The U.A.'s produced no first class honours, and even after eliminating the short course people they show twice as great a proportion of academic failures as the inexperienced. The S.T.'s also produced half the proportion of good honours, and a higher proportion of failures. In comparison with this adverse effect it was found in Part I that the women showed no compensating advantages in increased teaching achievement as a result of the experience. It is probable that in both sexes the preference for teaching experience has selected a number of candidates of mediocre academic ability who were not likely to pass

the Higher Certificate examination and, therefore, sought the teaching experience as an avenue of admission to the Department. In the case of the women there seems to be a more direct adverse influence by the practical experience.*

So far as the men are concerned the experience seems not to have produced any serious adverse effect upon the abler students and for them a period of practical teaching of some twelve to eighteen months need not be feared upon academic grounds.† However, personal observation of the U.A.'s with more than two years service indicates that even if they are conscientious and hard-working, they find some difficulty in adjusting themselves to their new academic conditions.

II.—DO THE SCORES ON THE INTELLIGENCE TEST PAPERS INDICATE ANY SELECTIVE ACTION BY THE PRE-COLLEGE EXPERIENCE?

The intelligence tests were applied to students in the Training Department in their first and subsequent years. The tests consisted of batteries of standard types of questions suitable for adult subjects such as vocabulary tests, analogies, absurdities, reasoning, simple mathematical problems demanding no great technical mathematical ability, comprehension and completion tests. Any detailed analysis of the validity of the tests, or of their complex relation to academic ability and academic standing is not possible in this paper. It will be shown that in the aggregate, the scores on the test papers have tended to follow differences in academic results, where these may reasonably be supposed to indicate aggregate changes in ability.

All the individual scores on each test have been reduced to a standard scale with mean=100 and standard deviation=20. The numbers shown, therefore, represent deviations from a standard mean in terms of a given standard deviation. Table III shows the mean scores of students at the commencement of their first, second, etc., academic years.

* These results lend support to the finding of the Departmental Committee Report that many of the young teachers undergoing their practical teaching experience were seriously overworked—especially the girls (see p. 73).

† On general grounds it may be argued that for such students the break from the routine of the secondary school, providing opportunities for new experiences, for the application of knowledge gained in school to fresh problems, and for the exercise of a more real responsibility can be a distinct advantage. Too many of the Higher Certificate students come to the University with a schoolroom mentality and outlook and not much training in individual methods of work, or exercise of individual responsibility and initiative in studies. A year of responsible service away from the tutelage of subject teachers may encourage the mental maturity of many students and give them some opportunity of consolidating their intellectual gains.

TABLE III.

SHOWING THE MEAN SCORES OF STUDENTS AT THE BEGINNING OF THEIR FIRST AND SUBSEQUENT ACADEMIC YEARS.

	Academic Year.					
	1st.	2nd.	3rd.	4th.	5th.	6th and later.
No. of Students	340	370	252	292	174	22
Mean Score....	96.3±.72	98.6±.68	103.5±.79	106.7±.77	99.7±1.02	91.5±3.09
Differences....	—	2.3±.64	4.9±.73	3.2±.71	-7.0±.61	-8.2±2.7

TABLE IV.

SHOWING MEAN SCORES ON A FIRST INTELLIGENCE TEST MADE BY STUDENTS AT THE BEGINNING OF THEIR FIRST AND SUBSEQUENT ACADEMIC YEARS.

	Academic Year.					
	1st.	2nd.	3rd.	4th.	5th.	6th and later.
No. of Students	340	40	27	72	82	13
Mean Score....	96.3±.72	96.6±2.05	103±2.12	103.9±1.75	99.6±1.56	87.6±4.32
Differences	—	—	6.4	—	-4.3	-12

Mean score on a first test of 26 students eliminated at the end of their first academic year = 81.6±2.54.

It appears that the mean scores increase by significant differences up to the fourth year and then rapidly decrease. A large proportion of the students sat the tests more than once. Some of the increase may be due to practice effects. To eliminate this the mean scores of students taking their *first* test at the beginning of their first and subsequent academic years were calculated (see Table IV). It is found that the means fluctuate in a similar way to those first obtained. The increase up to the fourth year may represent some practice effect derived from the habitual taking of academic tests and to increasing confidence and sang-froid which this practice usually induces. There is strong reason for supposing, however, that selection plays an important part in causing the differences. In the first place the short course students return a

very low average. These students are eliminated at the end of their first year from the academic courses, also students who take longer than usual to complete their degree schemes, or who have got into academic difficulties may withdraw from the department for a year in order to improve their academic standing. A proportion of the vacancies in the department at the end of each session is offered to fee-paying students already in college in their first, second, or subsequent academic years. There is strong competition for these places and admission is granted only after a personal interview and an enquiry into the candidate's college record and general suitability. There is a tendency, therefore, to improve the personnel of the department until the fourth year is reached. The test results show no correlation with age, the age range of the students being from 18 to 35 years and the mean scores of the oldest students are no greater than those of the youngest. The tests appear to measure some factors of native ability not connected with length of academic training and experience, but correlated on the whole with the effects of the academic courses and degree regulations in so far as these select factors included within general intellectual ability.

The mean scores on first intelligence tests for the various pre-college experience groups are shown in Table V.

TABLE V.

SHOWING THE MEAN SCORES ON INTELLIGENCE TESTS OF GROUPS OF MEN AND WOMEN STUDENTS WITH VARIOUS TYPES AND LENGTHS OF PRE-COLLEGE TEACHING EXPERIENCE.

<i>Type and Length of Experience.</i>	<i>No.</i>	<i>Men.</i>	<i>No.</i>	<i>Women.</i>
All U.A.'s	65	105.4 ± 1.69	17	99.9
24 months S.T.'s	11	106.3	6	105.3
12 months U.A.'s	49	104.9	13	103.6
12 months S.T.'s	109	94.9 ± 1.28	83	96.8
Nil	189	99.5 ± .94	212	97.4
Total Sample	374	99.3 ± .69	318	97.5

Amongst the men students the following differences are found :

All U.A.'s—Total sample	=	6.1 ± 1.83
All U.A.'s—Inexperienced group.....	=	5.9 ± 1.94
All U.A.'s—12 months S.T.'s	=	10.9 ± 2.12
12 months S.T.'s—Total sample	=	-4.4 ± 1.45
12 months S.T.'s—Inexperienced group	=	-4.6 ± 1.59

The figures suggest that in whatever abilities the tests measure, the U.A. group of men is significantly better than the others and the S.T.'s probably inferior. No significant differences are shown by the different groups of women, the groups returning high scores being very small.

III.—WHAT RELATION IS SHOWN BETWEEN PRE-COLLEGE TEACHING EXPERIENCE AND THE SUCCESS ACHIEVED IN THE THEORY TESTS AT THE END OF THE PROFESSIONAL YEAR?

As we have already seen, one argument put forward by advocates of the pre-college experience is that it will increase the capacity of the average student for understanding and profiting by the "otherwise unrelated theory" of the professional courses. Why this rather sweeping assumption that the theory is always unrelated is not quite apparent. In some institutions, at least, very definite attempts are made by people who have been practising school teachers, to relate the theory, both within itself and to the realities of actual school conditions. However, an attempt has been made to get some light upon this position. The difficulty again is to get any adequate measure of appreciation of the theory. For our purposes it has been assumed that in the aggregate the students who understand and appreciate the theory of teaching to the highest degree will make the best scores on the theory papers.

This is, perhaps, not a very safe assumption but it is the best we can get. What relation then can be found between pre-college experience and the scores on the theory papers?

The papers were chosen in Theory of Education, Practice of Education and School Organization, and Special Methods of Teaching. The scores on each paper made by the students in each professional year were reduced to a standard score which permits of combining the results into a mean theory score. For the whole sample of students there is no appreciable relation between the theory scores so obtained and the pre-college experience. The correlation ratio for these factors was :

$$r = .12 \pm .04 \text{ (men) ;}$$

$$r = .09 \pm .04 \text{ (women).}$$

The salient features of the distributions are summarized in Table VI.

TABLE VI.

SHOWING THE PERCENTAGE OF VARIOUS TEACHING EXPERIENCE GROUPS
MAKING GIVEN SCORES IN MEAN OF THREE POOLED PROFESSIONAL THEORY
TESTS.

Teaching Experience.	Mean of Three Professional Tests.												Mean of Group.	
	115+				114—85				84—					
	Men.		Women.		Men.		Women.		Men.		Women.			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Men.	Women.
All U.A.'s	10	18	6	40	38	69	9	60	7	13	—	—	101.5	108.8
12 months U.A.'s	4	10	5	42	32	78	7	58	5	13	—	—	99.3	110.1
12 months S.T.'s	15	17	13	18	55	61	52	73	20	22	6	8	98.7	103.1
Nil	28	17	38	18	105	62	146	69	37	22	26	12	97.8	102.0
Total Sample ..	53	16	57	19	208	64	209	70	65	20	33	11	98.7	102.2

It will be noticed that the men U.A. groups who were markedly superior in experience and in teaching capacity show very little if any significantly better results in theory than the other groups. The women students as a whole are better than the men, the inexperienced group of women returning a mean score as good as that of the most experienced and capable men's group. The best returns are made by the women U.A.'s, whose teaching achievement was not much, if any, better than the inexperienced students showed. It would seem, therefore, that considering the results as a whole, the argument based upon the value of pre-college experience for improving the understanding of the theory is not very strong in fact. At the same time if we refer again to the Table X, Part I, we see that there is a tendency for the high scorers in the theory papers to make the best average teaching achievement, but this is true for the less experienced men and the inexperienced as well as for the others, though not to the same extent. It would seem, therefore, that *there is some relation between teaching achievement and success in theory apart from the effects of previous experience.* It is likely that the school practice periods in the professional year have as much influence on the understanding of the theory as the student teacher preparation. Table XI, Part I, shows again that amongst the men students the effects of experience are most strongly marked in the group making the highest mean scores

on the combined theory papers, and it should be noted that the type of experience is more important than the length of it. Those in whom the pre-college experience produces the greatest effect seem also those who score most highly on the theory papers, and this group also scores most highly on the intelligence tests.

It is reasonable to suppose that as well as a direct connection between experience and theory scores, they are connected by a common relation to a native ability to profit by experience, and an interest in the work.

The success of a student in the theory papers, other things being equal, will depend to a high degree upon abilities more concerned with academic success in general than with professional work, such as memory, capacity to set out clearly on paper an answer to a question, logical and analytical skill, etc. The divorce between interest in and knowledge of the principles of education as distinct from the practical conduct of class work and skill in the art of teaching, and teaching success, is proverbial in the wide world outside the walls of the training institutions. In this sample of students it is clear that the factors entering into success in theory of education are more closely related to teaching grade, academic record, and in the case of the women students to what is measured by the intelligence tests than they are to teaching experience obtained before entering college. This is indicated by the following coefficients of correlation :

<i>Coefficient of correlation between average scores on theory papers and :</i>	<i>Men.</i>	<i>Women.</i>
(1) Teaching experience.....	$\cdot 115 \pm \cdot 04$	$\cdot 09 \pm \cdot 04$
(2) Teaching grade	$\cdot 33 \pm \cdot 03$	$\cdot 37 \pm \cdot 03$
(3) Academic record	$\cdot 46 \pm \cdot 03$	$\cdot 27 \pm \cdot 04$
(4) Intelligence scores	$\cdot 14 \pm \cdot 04$	$\cdot 37 \pm \cdot 04$

The comparatively close relation between the theory scores and the academic record amongst the men is shown graphically in Fig. I. The curves show the relation between the two sets of factors when the teaching grade is kept constant. The mean score for each teaching grade was calculated. It will be noted that the academic record of the C+ group as well as their theory scores are both relatively high. Observation of

individuals in this group indicated the presence of a number of graduates with good honours degrees of the stodgy, thoroughly conscientious, persevering type, whose steady application to the job in hand is admirable but whose classroom manner while sound in an orthodox way is relieved by no admixture of liveliness, sense of humour, or originality. These are the people who may get pupils through a stereotyped examination syllabus in an efficient way but who may bore their victims to desperation in the process. For comparison the average length of time spent by each grade in pre-college teaching experience is given in Fig. I (in months of U.A. service or its equivalent). The graph shows clearly the preponderant influence of the factors in academic ability upon the theory scores. The case of the A grade is interesting. They have a very high relative pre-college experience, and from observation of the individual men concerned, a strongly developed interest in the work and enthusiasm as distinct from a conscientious acquiescence in it. From the A to the B+ group the academic record and with it the mean scores on the theory paper moves in a direction opposite to the length of experience. The latter, however, influences the mean scores on the practice paper and to a much greater extent the mean score on the special methods paper. Table VII shows that for the men a *pre-college experience of more than twelve months as uncertificated assistants* is necessary to make any significant impression on the theory scores and then the effect is most powerful in the special method work rather than in the more general theory.

TABLE VII.

SHOWING MEAN SCORES MADE BY GROUPS WITH VARIED TEACHING EXPERIENCE IN EACH OF THE PROFESSIONAL THEORY PAPERS. MEN STUDENTS.

Pre-College Teaching Experience.	Mean Scores on Papers in		
	Theory.	Practice.	Special Methods.
More than 12 months U.A.	103.2	102.5	108.9
3 to 12 months U.A.	96.9	95.9	101.9
3 to 12 months S.T.	96.4	97.4	100.6
Less than 3 months	98.3	96.9	96.5

GRAPHS SHOWING THE MEAN SCORES ON INTELLIGENCE TESTS, PROFESSIONAL THEORY PAPERS, MEAN POINTS FOR ACADEMIC RECORD, AND MEAN LENGTH OF PRE-COLLEGE TEACHING EXPERIENCE CALCULATED IN UNITS OF U.A. SERVICE, MADE BY THE STUDENTS IN THE A, B+, B, ETC., GRADES OF TEACHING ACHIEVEMENT.

MEN STUDENTS.

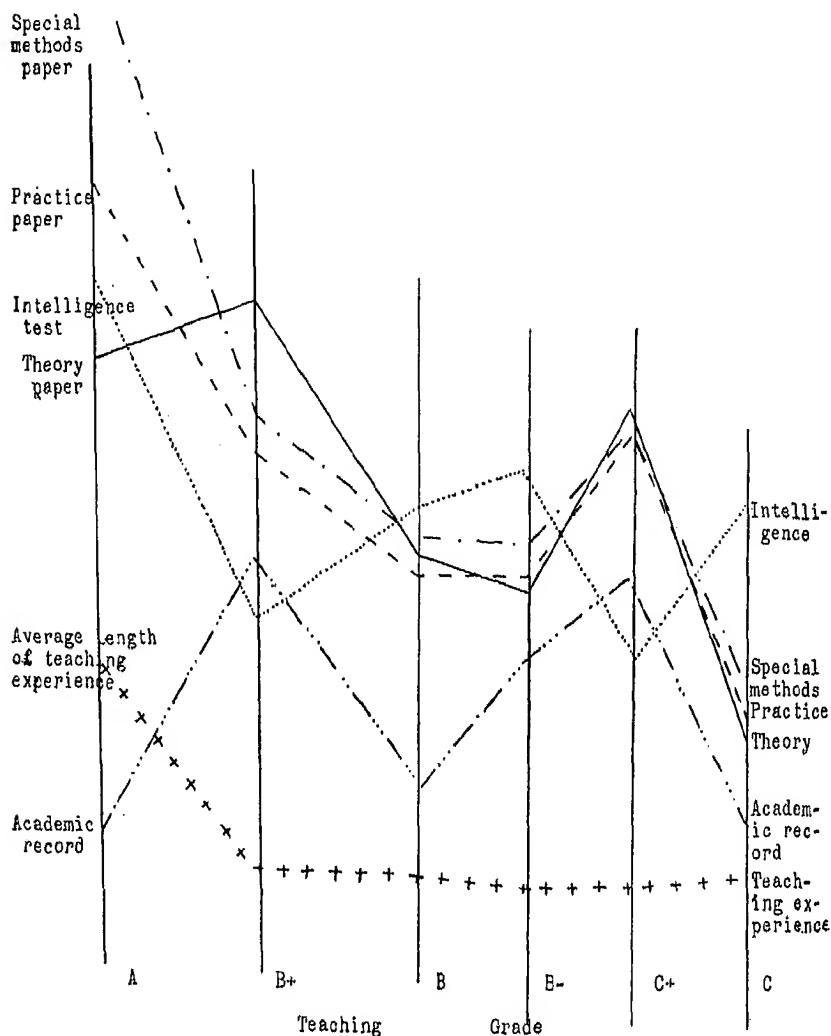
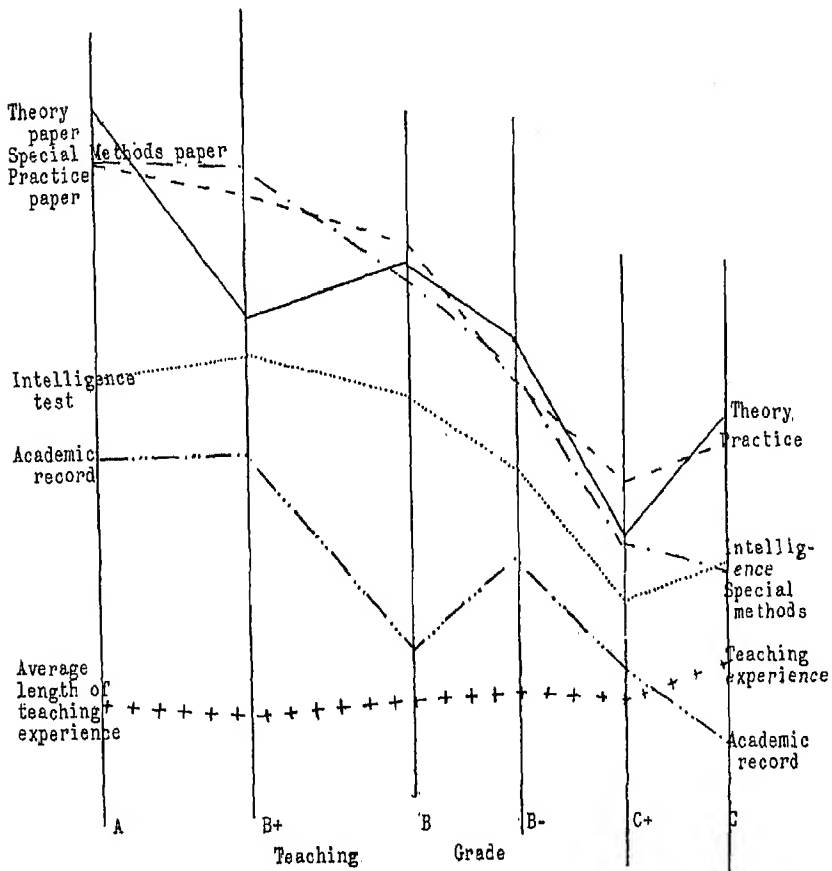


FIG. II.

GRAPHS SHOWING THE MEAN SCORES ON INTELLIGENCE TESTS, PROFESSIONAL THEORY PAPERS, MEAN POINTS FOR ACADEMIC RECORD, AND MEAN LENGTH OF PRE-COLLEGE TEACHING EXPERIENCE CALCULATED IN UNITS OF U.A. SERVICE MADE BY THE STUDENTS IN THE A, B+, B, ETC., GRADES OF TEACHING ACHIEVEMENT.

WOMEN STUDENTS.



The raw correlation between teaching experience and mean pooled theory scores is $.115 \pm .04$. Applying the formula for partial correlation between these two when both academic record and teaching grade are supposed constant, the coefficient is raised to $.254$. That is, after

eliminating the effects of academic ability and teaching success the pre-college experience tends very slightly to increase the theory scores. An attempt was made to illustrate this point by reference to actual numbers, but the groups involved were very small. However, considering three experience groups, having six and above U.A. months, 0·5 to 5·5 U.A. months, and nil, for the distribution as a whole there was a much stronger tendency for the mean theory scores to follow academic record and teaching grade than previous teaching experience. Among the women students, teaching grade, academic record, and intelligence scores are all more closely related to the mean theory scores than is the pre-college experience.

General observation of the actual students as well as consideration of the statistical measures indicates that the connection between teaching success and knowledge of the theory of education is due rather to interest in the work of teaching and to character traits like desire to succeed, and striving to attain some ideal of professional efficiency rather than to any direct connection between the two. Given these characteristics in a student then a deliberate attempt will be made to analyse mistakes, seek improvements, compare methods from both practical and psychological points of view and apply the general principles of method to a particular schoolroom problem. Without these interests and desires, no matter what may be the sheer intellectual ability of the student, both practical teaching and the studies of theory tend to be taken up as so much academic exercise to be got through, and no attempt is made to understand the relation between the theory and its practical applications. To teachers of this type, teaching is merely a process in which a given quantum of grammar, science, literature, vocabulary, or what not of academic material is unloaded upon a class of children who will probably be bored in any case, so they imagine. To this type of teacher the only conception of method or system in the teaching will be that indicated by the particular structure of the subject matter. These people go through a university diploma course because it is nowadays the thing to do, but the real inwardness of teaching principles never enters into their understanding. The raw correlation between teaching grade and mean theory scores is found to be ·33 for the men and ·37 for the women. Applying the formula for partial correlation these coefficients are :

- (a) When academic record is eliminated ·32 (men) ·30 (women).
- (b) When intelligence record is eliminated ·33 (men) ·34 (women).
- (c) When teaching experience is eliminated ·34 (men) ·37 (women).

The relation, therefore, in the sample as a whole is independent of the factors eliminated. This strengthens the hypothesis based on observation that the relation actually found is due to a third set of factors such as zeal and interest. In this case unless the pre-college experience is so conducted as to appeal to these factors of zeal and interest so as to include them in the same general situation with the knowledge of theory and the practical art of classroom management, the previous experience is not likely to have much bearing upon the theory in the minds of the young teachers.

IV.—SEX DIFFERENCES BETWEEN MEN AND WOMEN STUDENTS IN RELATION TO TEACHING SUCCESS.

The statistics already shown have made it clear that there are marked differences between the men and women students with respect to the problem of teaching success. This point is brought out by a comparison between the coefficients of correlation shown in Table VIII. Out of six pairs of factors, only two in the case of the men show any significant connection, namely teaching grade with average theory scores, and academic record with average theory scores. For the women five pairs out of six show a significant connection.

TABLE VIII.

SHOWING COEFFICIENTS OF CORRELATION BETWEEN PAIRS OF FACTORS CALCULATED FOR MEN AND WOMEN STUDENTS SEPARATELY.

	<i>Men Students.</i>		
	<i>Academic Record.</i>	<i>Intelligence.</i>	<i>Average Theory Scores.</i>
Teaching grade	$\cdot 09 \pm \cdot 03$	$\cdot 03 \pm \cdot 04$	$\cdot 33 \pm \cdot 03$
Academic record	—	$\cdot 02 \pm \cdot 04$	$\cdot 46 \pm \cdot 03$
Intelligence	—	—	$\cdot 14 \pm \cdot 04$
	<i>Women Students.</i>		
	$\cdot 40 \pm \cdot 04$	$\cdot 17 \pm \cdot 04$	$\cdot 37 \pm \cdot 03$
Teaching grade	—	$\cdot 31 \pm \cdot 03$	$\cdot 27 \pm \cdot 04$
Academic record	—	—	$\cdot 37 \pm \cdot 04$
Intelligence	—	—	—

The tendency for the various factors to vary together more in the women than the men is shown also by the curves in Figs. I and II. It is hoped that this sex difference with respect to the professional preparation of teachers may be analysed in a future investigation.

V.—WHAT FACTORS HAVE PREDICTIVE VALUE?

The selector who is trying to get the best applicants for admission to a training department wants to know what sort of professional result will be produced by any given candidate in four or more years time. A glance at the table or correlations shows that there is not a single factor dealt with in this analysis, which taken by itself could be used as any sort of a reliable guide to future teaching success or failure. In addition the men and women provide two problems, and criteria which might be useful in the one case would afford practically no guidance in the other. Pre-college teaching experience of at least one year duration of the uncertificated assistant type, in the absence of unfavourable reports on the candidate's zeal and general education, in the case of men; and academic record in the case of the women are the only factors in this sample of students which might be used as a possible guide to future success, and the predictive value of these is not high. All the evidence suggests that given a minimum of intelligence and academic ability, success in teaching is most strongly determined by qualities of personality, character, and temperament for which as yet there are no very adequate tests. There seems to be a limit beyond which the possession of a pleasant personality, force of character, sympathy and tact will not compensate for intellectual defects, but this limit seems to be well down in the intellectual scale, at least for elementary and probably a good deal of secondary school work. The importance of personality and character qualities is shown by an analysis of the short course and uncertificated assistant groups of men students. The records kept for departmental purposes were reviewed and the descriptions characteristic of each student were noted. The main traits of the short course students are given in Table IX, of the U.A.'s in Table X. The differences in personality and character traits are very marked as between the two groups.

TABLE IX.

SHOWING TEACHING GRADE AND CHARACTERISTICS OF SHORT COURSE
MEN STUDENTS.

	A	B+	B	B-C+	C	C-	D
Easy-going, complacent and self-satisfied, lazy	—	—	—	—	2	2	2
Nervous, worried, no confidence, lack of initiative and drive.....	—	—	1	—	2	1	—
Hardworking and conscientious, but academically poor	—	—	3	2	—	—	—
Badly adjusted, temperamentally difficult	—	—	1	—	—	—	—

TABLE X.

SHOWING TEACHING GRADE AND CHARACTERISTICS OF UNCERTIFICATED
ASSISTANT MEN STUDENTS.

	A	B+	B	B-C+	C	C-	D
Strong and attractive personality	6	9	27	9	1		
Enterprising, energetic, self-confident							
Enthusiastic, zealous							
Hardworking, conscientious, reliable							
Adaptable, resourceful							
Clear-minded, alert							
Sympathetic, tactful							
Nervous, no confidence	*1		†1	‡7	10		
Plodding, not adaptable							
Easy-going, lack of drive							
Aggressive, tactless, unsympathetic							
Not clear in thinking or exposition							
Temperamentally difficult							

The following uncertificated assistants appeared in both sections of the classification :

*One A.—Easy-going but very interesting personality and high natural teaching skill.

† One B.—Lacking in drive.

‡ Seven B— or C+ who had some of the qualities of the first section together with colourless personality, lack of confidence, and adaptability.

VI.—SUMMARY OF RESULTS AND CONCLUSIONS.

- (a) Pre-college teaching experience is correlated with lower academic record in the whole sample analysed, but in detail the adverse effects are restricted to the student teacher and long service uncertificated teacher groups of men. Both twelve month U.A.'s and twelve month S.T.'s produce as high proportion of 1st class honours men as the inexperienced group, and the U.A.'s as a whole no greater proportion of failures. Apart from the selection of academically poorer candidates by the conditions of preference, particularly student teachers, a period of twelve to eighteen months experience before entering college does not appear to have much adverse effect upon the men students.
- The academic records of both U.A. and S.T. groups of women are distinctly worse than those of the inexperienced students, the U.A. women producing no 1st class honours, and twice as high a proportion of failures as the latter. It would appear from this that the period of experience has a directly harmful effect upon the women.
- (b) The uncertificated assistant group of men show significantly better results in the intelligence test than the other men's groups. It seems likely that this type of service has selected a better type of candidate for the profession.
- (c) In general, pre-college experience has produced very little effect upon success in the professional theory examinations. Teaching grade achieved, academic ability, and in the case of the women students intelligence as measured by the tests, are more closely related to success in theory than previous experience. The claim that practical experience before entering college is necessary for understanding educational theory does not seem strong, in fact, in the case of experience as it is organized at the present time.
- (d) There are marked sex differences in this sample of students with respect to professional preparation and the factors entering into teaching success.

APPENDIX I.

In view of the fact that the measures used in this analysis have not been specially prepared, but accumulated in the ordinary course of departmental routine, it is interesting to compare the results obtained with the reports of some American investigators using smaller samples of students but specially prepared measures. Generally the results show relations of the same order of magnitude.

G. T. SOMERS (Pedagogical Prognosis; Columbia Contributions to Education, No. 140, 1923) working with women students at a Normal College reports :

- (a) Very little relation between age and (i) college marks, (ii) school practice grades.
- (b) With Thurston's Cycle-omnibus and Trabue Language Completion Tests a correlation of $.48 \pm .04$ with school practice grades was found. These tests probably measure speed of working and supply of available information as well as intelligence as usually defined. After allowing for other factors the author concludes that intelligence shows a small positive correlation with teaching accomplishment.
- (c) Academic record and assessment of teaching efficiency during the first year of leaving college showed a correlation of $.707$. Since school practice teaching and first year professional teaching also correlated to the extent of $.700$, the author finds a connection between academic record and teaching success.
- (d) Coefficients of $.608 \pm .03$ between estimates of personality traits and school practice teaching, and $-.577 \pm .04$ between disciplinary failures in college and teaching were found.

This author concludes that no single measure is sufficiently highly correlated with teaching success to afford a good basis of prediction, a combination of judgments of personality traits, mental tests, and academic records being most satisfactory for this purpose.

L. L. MERIAM (Normal School Education and Efficiency in Teaching; Columbia Contributions to Education, No. 1, 1906) attempted to discover what relation appeared between academic records in the normal schools, professional subject matter test, and future teaching ability. The author found correlations between post-college teaching grade and :—

- (a) Psychology marks = $.37$.
- (b) Principles and practice of teaching = $.28$.
- (c) Method courses..... = $.29$.
- (d) Academic courses..... = $.22$.

The report suggests that neither differences in scholarship, nor score in professional subject-matter examinations, provided any significant index of teaching ability.

F. B. KNIGHT (Qualities related to success in teaching in 156 Elementary and High School Teachers in Massachusetts; Columbia Contributions to Education, No. 120, 1922) reports the following :

- (a) Age is an irrelevant factor within the age limits at which people usually teach.
- (b) Experience is not a factor of large significance in assuring teaching success.
- (c) Correlations between general teaching ability and scores in Thorndike Entrance Tests for College Freshmen were :
 $r = .73 \pm .10$ for elementary group ;
 $r = .45$ for the secondary group.
- (d) Correlation between Normal School success and general teaching ability = $.33$.

On the whole the author suggests, the general factor of interest in the work becomes the dominant factor in determining success in teaching.

C. W. BOARDMAN (Professional Tests of Teaching Efficiency in High School; Teacher's College, Columbia University, 1928) found the raw correlation between assessments of teaching grade and psychological test = $.332 \pm .095$; and between assessments of teaching grade and the combined scores of three tests namely, psychological test, professional information test, and procedure test = $.340 \pm .094$.

APPENDIX II.

TABLE OF CORRELATION COEFFICIENTS.

		Teaching Exper.	Academic Record.	Intelli- gence.	Theory Scores.	Practice Scores.	Method Scores.	Average Theory.
Teaching grade.	M.	$.26 \pm .03$	$.09 \pm .03$	$.03 \pm .04$	$.28 \pm .03$	$.27 \pm .03$	$.26 \pm .04$	$.33 \pm .03$
	W.	$.05 \pm .04$	$.40 \pm .03$	$.17 \pm .04$	$.26 \pm .04$	$.30 \pm .04$	$.35 \pm .03$	$.37 \pm .03$
Academic record	M.	$.36 \pm .03$	—	$.02 \pm .04$	$.36 \pm .03$	$.34 \pm .03$	$.35 \pm .03$	$.46 \pm .03$
	W.	$.30 \pm .03$	—	$.31 \pm .03$	$.18 \pm .04$	$.22 \pm .04$	$.26 \pm .04$	$.27 \pm .04$
Intelligence . . .	M.	—	—	—	$.06 \pm .04$	$.07 \pm .04$	$.17 \pm .04$	$.14 \pm .04$
	W.	—	—	—	$.23 \pm .04$	$.29 \pm .04$	$.26 \pm .04$	$.37 \pm .04$
Theory scores..	M.	—	—	—	—	$.51 \pm .03$	$.36 \pm .03$	$.77 \pm .02$
	W.	—	—	—	—	$.50 \pm .03$	$.35 \pm .03$	$.77 \pm .02$
Practice scores..	M.	—	—	—	—	—	$.40 \pm .03$	$.80 \pm .01$
	W.	—	—	—	—	—	$.46 \pm .03$	$.80 \pm .01$
Methods scores.	M.	—	—	—	—	—	—	$.74 \pm .02$
	W.	—	—	—	—	—	—	$.73 \pm .02$
Teaching Experience . . .	M.	—	—	—	—	—	—	$.115 \pm .04$
	W.	—	—	—	—	—	—	$.09 \pm .04$

M. = Men. W. = Women.

Résumé.

L'EXPÉRIENCE PRATIQUE DANS L'ENSEIGNEMENT ANTÉRIEURE À L'ENTRÉE À L'UNIVERSITÉ ET D'AUTRES FACTEURS CONTRIBUANT AU SUCCÈS PROFESSIONNEL DES ÉTUDIANTS D'UNIVERSITÉ.

L'expérience pratique de l'enseignement, gagnée avant l'entrée à l'université, produisit des effets défavorables sur les résultats d'examen des étudiantes en question, qui montrèrent une proportion inférieure de bons examens et une proportion beaucoup plus élevée de chutes, que les étudiantes dépourvues d'expérience pratique. Chez les étudiants un stage de douze à dix-huit mois d'enseignement

pratique semblait produire peu d'effet défavorable sur leurs résultats d'examen. Il faut noter cependant, que la préférence accordée à l'expérience pratique, comme condition d'entrée à la Section Pédagogique, semblait opérer le choix de quelques hommes de valeur intellectuelle inférieure.

L'affirmation, qu'il faut avoir quelque expérience pratique avant la préparation professionnelle, pour pouvoir comprendre la théorie pédagogique, n'est pas soutenue par ce groupe d'étudiants. L'expérience antérieure, telle qu'elle a été organisée dans leur cas, a peu de rapport, ou n'en a point, avec le succès dans les examens de théorie professionnelle. Ce succès se rapporte plutôt à l'aptitude générale à l'enseignement, et à l'aptitude aux études universitaires, qu'à l'expérience antérieure.

On a découvert que la corrélation entre la note dans l'épreuve pratique et le succès dans l'épreuve théorique n'est pas influencée par le manque d'expérience.

Des différences marquées entre les sexes se manifestent en ce qui concerne la préparation professionnelle et le succès dans l'enseignement.

ZUSAMMENFASSUNG.

LEHRERFAHRUNG VOR DEM STUDIUM AN EINER UNIVERSITÄT UND ANDERE FAKTOREN IM LEHRERFOLG VON UNIVERSITÄTSSTUDENTEN.

Praktische, vor dem Eintritt in die Universität erworbene Lehrerfahrung wirkte nachteilig auf die akademischen Resultate, die von den in Frage kommenden Studentinnen erzielt wurden; denn diese legten verhältnismässig weniger Examen mit Auszeichnung ab und wiesen im Verhältnis viel mehr Misserfolge auf als die unerfahrenen Studentinnen. Was die Studenten angeht, so schien-abgesehen von einer Tendenz, der praktischen Erfahrung in den Eintrittsbedingungen zur pädagogischen Abteilung den Vorzug zu geben, welche einige Leute von geringerer akademischen Qualität auszusuchen schienen- eine 12-bis 18-monatige Lehrtätigkeit einen wenig bedenklichen Einfluss auf die akademischen Ergebnisse zu haben.

Die Behauptung, dass praktische Erfahrung vor der beruflichen Ausbildung nötig sei, um die Lehrtheorie zu verstehen, bestätigt sich nicht bei diesem Beispiel von Studenten. Die vorhergehende Lehrerfahrung, wie sie in ihrem Fall organisiert worden ist, hatte wenig, wenn irgendeinen Einfluss auf den Erfolg bei den Prüfungen für Berufstheorie. Derartige Erfolg hängt viel mehr mit einer allgemeinen Lehrfähigkeit, akademischer Fähigkeit zusammen, als mit früherer Erfahrung. Man hat herausgefunden, dass die Korrelation zwischen dem Rang eines Lehrers und dem Erfolg bei der theoretischen Prüfung durch die Ausschaltung früherer Erfahrung unbeeinflusst bleibt.

Stark betonte Unterschiede bei den Geschlechtern erschienen mit Bezug auf berufliche Vorbereitung und Lehrerfolg.

TEMPERAMENTAL DIFFERENCES IN THE BEHAVIOUR DISORDERS OF CHILDREN.*

BY EMANUEL MILLER.

- I.—*Introduction.*
- II.—*Source of material.*
- III.—*Method of enquiry.*
- IV.—*The children concerned.*
- V.—*Temperamental qualities selected for special study.*
- VI.—*General conclusions.*

I.—INTRODUCTION.

THE fact that we can speak of angles of approach to the study of difficult children implies an awareness that we are dealing with a complex whole which only the needs of scientific method can analyse into elements. The laboratory method of investigation makes necessary the study of particular functions, although the advantages of the method lie in the fixing of the conditions of experiment. In the assumed normal case, formal psychology presents us with more or less stereotyped categories which can be studied, but when one is confronted by the difficult child, we are initially discouraged by the number of variables that enter into the life of the child, and the varied circumstances which occasion a given peculiarity in conduct. Except in the newly born we are dealing as with a palimpsest with a series of processes written over and qualified by many others ; by reflexes strangely conditioned ; by physical defects which give rise to psychological compensations ; by instincts inhibited, re-directed and educated by social needs ; by application to external circumstances subject to intellectual poverty or retardation, and temperaments disguised by force of circumstances. In fact from the very earliest years we witness personality traits emerging which bring home to the observer the inextricable tangle of affective, cognitive, and conational processes.

In any attempt at correcting the behaviour disorders of children the physician-psychologist works empirically because the specific circumstances governing the emergence of the disorders seem to be all important, and to a large extent one is under an obligation to weigh up without reference to general principles the relative importance of factors of environmental as against personal factors such as inhibitions,

* As read before the Psychological Section of the British Association, September, 1932.

temperament and the operation of stimuli in the early life of the child which arouse emotional responses through the limitations placed upon instinctual trends. But willy-nilly one soon searches about for general principles which govern even specific responses. For example, one asks oneself to what extent does limited intelligence make for the emergence of behaviour disorders and neurosis. Can the cognitive life be sharply marked off from emotional attitude, or are the operations of complexes wholly responsible for the peculiarities of behaviour.

II.—SOURCE OF MATERIAL.

The children on whom this enquiry was based were referred to a Child Guidance Clinic: largely from school medical officers and head teachers, and probation officers working in the Juvenile Courts. The organization of a Child Guidance Clinic gives undoubtedly a unique opportunity for a many-sided investigation of problem children. In the first place, all children with gross physical disorders, including diseases of the nervous system, were eliminated and no children with statutory mental deficiency are treated. The physician in charge, however, examines the child physically mainly to ascertain whether no organic disease has remained undetected, and in addition, he makes a morphological examination on anthropometric lines for the purpose of classifying physical types made familiar to us by Kretchmer, Pende, MacAuliffe, Sigaud, and others. Every child submits to intelligence tests (Stanford Revision of the Binet-Simon scale) and a full range of Performance Tests. Reports from the schools give a teacher's estimate not only of the child's educational attainments but of his sociability, rapport with teachers and pupils, sullenness, truthfulness, impulsiveness, and general application to work. The social psychiatric worker in making an investigation of the environmental factors is also trained to assess in a qualitative way the child's behaviour and attitude in the home circle, and also obtains from the mother her estimate of the child's psychological make-up. Comparisons are always made between the child patient and other members of the family. In the playroom of the clinic one is able to observe the attitude of the child towards other children at play, and also his method of attack in constructing and drawing. This play observation is again observed when the child is alone with the physician. At case conferences at which physician, psychologist, social worker and class teacher are present, the various findings with regard to the above observations are discussed and related to the problem for which the child has been referred to the clinic.

The present enquiry into the temperamental endowment of problem children was the result of prolonged observation and testing of a group of patients. The attempt was a difficult one, perhaps a fruitless one in the present state of our knowledge, when the very concept of temperament is being bombarded by endocrinology on the one hand and psychoanalysis on the other.

III.—METHOD OF ENQUIRY.

The attempt was made only by deliberately formalizing the problem, that is, by defining as clearly as the material would allow, temperamental traits which could be filtered off from the turbulent stream of data—medical, heredity, intelligence and clinical history—i.e., the emotional unfolding of the neurosis or the behaviour disorder. The organization of a Child Guidance Clinic helped us because, as a team of social workers, psychologist and psychiatrist, with, in addition, school reports and playroom observations, we could see the child from a series of independent angles, yet the same child all the time. The study of the family allowed for an intimate picture of the child amongst others of the same stock, yet with distinguishing personality traits. We had parents' estimates of temperament and the views of brothers and sisters. The school teacher gave us a picture of the child's responses to school life both cognitive, affective—his social behaviour too. The psychiatric survey gave us the particular problem for which the child was referred, and the history of its development and the child's response to environmental forces. Above all we could enter into a fairly minute study of its physique and its dominant physiological responses—an important matter in marking off certain aspects of temperament. Lastly, and most important of all observations, there was the psychologist's report not merely upon the child's intelligence as measured by an Intelligence Quotient, but the account of an experienced observer on *the way in which a child attacked problems* in the Binet-Simon Tests and in Performance Tests. Broadly speaking, therefore, we had two large fields from which to categorize the temperamental differences of our subjects. One, a clinical field surveyed from a variety of aspects—social, psychiatric, scholastic, and play activities; two, an experimental field—the more or less fixed situation of the test investigation.

In the first field we had a very varied number of data, qualitative in character but capable of classification; and, secondly, a constant method of observation under specific circumstances which were the same for all the children seen—that is to say, the test situation was the same, the operator was the same.

Our next step was to choose processes which could be studied in both fields and to score them for the purpose of statistical arrangement.

IV.—THE CHILDREN CONCERNED.

The children who were subject to investigation were of both sexes and their ages ranged from six years to fifteen; the majority, however, fell between the ages of seven and ten and twelve and fifteen. Racially, the group of cases was of interest seeing that approximately half were of Jewish birth, the other half were English, Scottish and Welsh, and Irish with mixtures of both, and four cases were of mixed Jewish and Gentile stock. Socially the children came from artisan and labouring families with a sprinkling of shopkeepers and small master craftsmen.

The range of disorders for which the children were referred was a very wide one. These disorders varied from excessive shyness and lack of sociability, fears or phobias, night terrors, somnambulism, nocturnal and diurnal enuresis, ideas of reference and obsessions, hysterical disorders of walking, backwardness at school, a few cases of feeble-mindedness with nervous symptoms, temper tantrums, violent outbursts of rage, cruelty to other children, rebellion in school, minor sexual offences such as exhibitionism and curiosity, stealing, wandering and destruction of public property.

Roughly speaking the disorders could be sub-divided into: (1) psychoneuroses and personality disorders largely subjective in character, e.g., bed-wetting, excessive phantasy, hysterical vomiting, lassitude, shyness, locked-in disposition, etc.; and (2) objective disorders or behaviour disorders expressed as attacks upon or violent rejections of the external environment, e.g., temper tantrums, violence, excessive activity, and some forms of delinquency.

While many cases were referred for one symptom or behaviour disorder, in most of the cases two or more disorders of emotional control and external behaviour were discovered during the course of investigation. It was found, however, that in the younger subjects, that is, under ten years of age, the tendency was for a child to present either subjective or objective disorders in pure form, whereas in the older group—twelve to fifteen—the puberty group—there was a tendency for subjective and objective disorders to go together.

A common source of difficulty in handling these cases has always been a discrepancy between the family and the school estimate of a child's temperament and behaviour. Teachers are occasionally surprised when one or other of their favoured pupils is brought to the clinic by the parents, and *vice versa*, parents are annoyed when their children have

been found wanting by the teacher. The child who frustrates the teacher's purpose is not infrequently the over-favoured child of the home, and the child discontented in the home may find satisfaction in school life and sympathy and understanding from a school teacher. Consequently one would be gaining a false impression of temperamental equipment if one judged partially from one or other of these main reports. Thus in order to ascertain the basic type of reaction of a child, it was necessary to take a series of such cross sections and to reconstruct the child's life by obtaining a longitudinal section which would reveal processes of reaction formation. In this manner we were able to form a judgment of the weight of external circumstances in producing both subjective and objective signs, and so to arrive at an estimate of the specific factors in psycho-physical make-up.

Personality unfolding is the resultant of the child's inheritance manifest in physique and temperament colouring, and the vicissitudes of experience in the early years of life. In the first few years the child has a series of native endowments, instinctual and cognitive, which hold commerce with the external world that acts not only as food for mental growth, but as stimulus also. Were there no inborn peculiarities it would not be unreasonable to suppose that given a similar environment children would react in the same way. Their reflexes would be conditioned in a like manner, their instincts would be inhibited on the same plan, and given similar intellectual endowments their skill in understanding and manipulating the external world would be the same. To substantiate that this is not so was the motive of this enquiry. One was struck particularly in the study of a series of brothers who were referred for the same behaviour disorders. In a series of four pairs of brothers who were guilty of minor delinquencies and who carried out these delinquencies in collaboration, temperamental differences in the pairs was very striking indeed. It would seem as if the collaboration was made possible by the fact that the pairs were temperamentally the complement of one another. In one pair of brothers, "A" was a robust muscular type of physique with a vigorous engaging expression, of good intelligence, and who was responsible for the execution of the particular delinquency. He it was who did the stealing and the actual spending. The other brother, scarcely two years his senior, was less robust in physique, somewhat angular, and rather furtive in expression. He was less mobile and not so ready to respond without thinking of a possible path of escape. It was he who planned the delinquencies and recommended the way in which the stolen money should be spent on each occasion. The robust and active brother was always on the move, cheerful and not given to introspection. The other was

somewhat torpid in manner, less sociable and preferred reading and drawing pictures of a simple but imaginative type. Both these brothers have suffered the same family vicissitudes. The attitude of the parents towards them shows no favouritism, nor did the family life alter in the two years which represents the age interval between them. In other words, there is a distinct difference in temperamental endowments which makes each approach the world with its similar problems in different ways. Two other brothers presented the same type of difference. They stole together, wandered together and quarrelled with their parents. One is morose and given to intermittent sickness, and is obstinate and intermittently impulsive at home; the other is sociable, always grinning, and his opposition at home is characterized by an uncontrollable loquacity, yet he has a certain tenderness and tractability. Of two sisters in a family, which is disturbed by the sickness of the mother and by a father with an erratic temper and psychoneurosis, but an over supply of paternal affection, the one sister had had a considerable amount of subjective disorders with hysterical symptoms while the other is always openly quarrelling and obstructing the family life. This child—the younger it is true—is the last of the family and the most favoured, but her disorder is expressed in behaviour anomalies without any signs of subjective distress or hysterical manifestations. Physically here, too, the distinction between the sisters is a sharp one. The elder of the two is an angular girl with a pinched face and a sulky expression. The younger has a beautiful physique and holds herself with an air of haughty obstinacy.

One could go back a generation and consider these temperamental differences as existing between the child and parent. As frequently happens in the clinic service, the parents of difficult children are psychological problems also. How often does one hear the parent saying: "He is just like his father," or "He gets all this from his mother." One mother, in describing her own reactions as against the child's, had occasion to say that when she was a child she would become sick if she were opposed or obstructed, whereas her little boy has a violent outburst of rage instead. As stated above, where therapeutic measures alone are concerned, the problem is attacked by considering the various stimuli that have produced this or that response, and an attempt is made to modify the stimulus or conflict in the family situation, or by modifying the child's attitude towards such a situation. Scientifically it was felt desirable to class the children in accordance with their fundamental make-up in temperament colouring and intelligence. For such a method of grouping would enable us to deal with our subjects in accordance with their natural endowments.

V.—TEMPERAMENTAL QUALITIES SELECTED FOR SPECIAL STUDY.

The welter of facts and observations that come with each child does certainly sharpen one's clinical skill and unconsciously the physician adopts the requisite attitude towards the particular child. But for our enquiry it was necessary to formulate certain traits of temperament. The field in which this was rendered immediately possible was the field of mental testing for intelligence. Firstly, because the conditions of tests were standardized, and secondly, because it was found, particularly in the Performance Tests, that a child betrayed while absorbed in its operations some of its fundamental temperamental endowments. However standardized in nature the cognitive tasks in the test situation may be, the child's temperamental responses are by no means extinguished. The cognitive response of the child takes place in a setting of temperamental qualities. In collaboration with Doctor Fortes, who was responsible for the mental testing of the children, it was decided as a result of the survey of a number of examples to choose at the outset three temperament qualities, not unmixed however with cognitive elements, as they seemed to show forth during the period of testing. Some children, however, once their confidence was won, always approached the tests with a superabundance of movement and restlessness, talking spontaneously and moving about in a way not suggestive of erratic and false movement, but rather of overflow. They were always in a state of tone. Others, however, sat silently throughout the testing, almost toneless and with a minimum of movement. This allowed us to formulate a category of *Mobility* which should be scored with a plus, minus, or zero sign of average or indifferent. It was, however, found that certain children had the capacity to inhibit their responses until they were able to perceive the outcome of an action and thus ultimately to perceive its rightness. This process was called *Prudence*. This capacity for inhibition was regarded as something different from a mere intelligent approach to a problem. For in many cases, although the child was poorly inhibited, it still showed from the result of a series of tests that it had an intelligent comprehension of the way in which the situation should be met. The inhibited child goes "hell for leather" at a problem, correcting errors or missing them, sometimes trusting to chance to extricate it from an impasse.

The power of sustaining a behaviour trend until a satisfactory conclusion was reached without boredom or distraction was called *Persistence*. These three variables were considered in the light of the Intelligence Quotient and their relationship to one another was established by calculating the coefficient of mean square contingency. My colleague

kept his assessment of these three variables for each child and I endeavoured to discover these variables from a study of the child's reactions during clinical investigations, by observation in the playroom and from the social report of the family life and the early history of the child and from the reports from the school teachers.

It is obvious that this method of assessment, which was purely a tentative one, was deficient, firstly, because only a little over a hundred cases were considered, and the method of classification is a somewhat rough one. Howbeit, at least an attempt to obtain a statistical estimate of the relationship existing between temperamental traits, intelligence and types of behaviour disorders. My colleague's figures for his coefficients were as follows :

(1) Age and Mobility	·19
Age and Prudence	·34
Age and Persistence	·30
(2) Mobility and Prudence	·28
Mobility and Persistence	·22
Prudence and Persistence	·40
(3) Binet I.Q. and Mobility	·34
Binet I.Q. and Prudence	·29
Binet I.Q. and Persistence	·29

Taking one particular Performance Test—the "Porteous Maze," in correlation with the three variables, it was found that its relationship with Mobility was ·25, with Prudence ·35 and with Persistence ·32. The relation of the Porteous Maze with the Intelligence Quotient was ·53.

When the clinical estimates were compared with the estimates made during the test situation, I found it difficult to discover from my own approach the degree of Prudence of the child, but we agreed in 80 per cent on the estimates of Mobility and in 70 per cent on Persistence.

In the ultimate correlations that were made as between Prudence and Impulsiveness, Doctor Fortes' estimate of Prudence was taken without blending with my own estimate, which I felt was unreliable when viewed in the light of the rigid conditions of tests from which he obtained his assessment of this trait. As regards all other traits which we had worked upon in our respective fields, such as Mobility and Persistence, the ultimate estimates which were used in the correlation were a blend of the Clinical and the Experimental.

On the clinical side—that is, the psychiatric anamnesis—the family story and the playroom observation—it was necessary to obtain the

data with regard to Persistence and Mobility from, firstly, teachers' and parents' reports. This consisted in a close account of the child's habit in the house and in school. The tasks and hobbies of everyday life were considered, the acumen with which they were carried out, the variability of interest and the frequency of boredom. Exuberance of energy, apart from specific symptoms, was considered, the directed character of activities was enquired into, and the child's demeanour during interviews with and without parents, when under direct observation and when allowed to move about unmolested and apparently not under observation. Practically all cases are encouraged to play freely in a special room with a variety of toys, games, constructional apparatus, sand, plasticine and clay. The child played alone or with others and one was able directly and from report to gain an insight into the child's mobility, his prudence in construction and invention of things which were self-determined and not directed in any way. His distractibility, fluctuating interest, and devotion to a self-imposed task were closely studied. In the playroom one is therefore able to observe prudence and persistence as they work themselves out spontaneously. Degree of rapport or isolation was observed, and the elementary expression of sensibility could be gauged. Some sit alone and puzzle things out, some sit alone bored or timorous, or obstinate and hostile. Others move from task to task finishing nothing and starting everything. Some work together harmoniously in little friendly groups, housing together behind a screen and imitating workmen passing bricks to one another. Impulsive members join erratically in group games, only to exhibit themselves in startling fashion for a moment, or merely to obstruct or even to cause discomfort and pain. Over long periods of varying circumstances and changing companionship the observer was in a position to score the subjects not only to Prudence, Persistence, and Mobility, but in addition for Impulsiveness, tendency to isolation or co-operation, and for Sociability. The scores were verified and corrected with reference back to observation in school and home.

This agreement on two temperamental categories, Mobility and Persistence, is a striking tribute to the value of Performance Tests as indications of temperamental equipment, not to speak of intelligence. It is a tribute also which I should like to take this opportunity of paying to a psychological investigator who does not merely assess the child's intelligence as an isolated faculty but sizes up the child as a whole—placing him or her in her temperamental setting ; in short, illustrates the way the cognition machine is set going by psycho-physical causes which extend beyond the bounds of the central nervous system. The freedom with which a child liberates energy in action is apparent : freedom from load

seems to be in sharp distinction from impulsiveness, which tended to express itself in the child's attitude to the external world of things and persons. Impulsiveness—the sudden sparks of energy in performing tasks, the wanton expression of emotions either over periods or on isolated occasions—seemed to occur in a variety of children and not always in those who were described as mobile. It occurred naturally enough most frequently amongst those who were referred for objective disorders such as delinquencies, temper tantrums, and sudden restlessness as in wandering and truancy. But it occurred not infrequently in those with purely subjective disorders and those with physical psychoneurotic symptoms such as bed-wetting, vomiting and intermittent non-organic debility.

To determine the distribution of Mobility, Impulse, and the relationship of the latter to objective and subjective disorders, the mean square category was calculated.

Impulse correlated in this wise with Mobility approximately .5. Of 113 cases twenty-six were highly mobile and very impulsive; twenty-four cases showed an average degree of both, and fifteen were of low mobility and low degree impulsiveness.

When Mobility was related to the subjective or objective manifestations of disorders, it was found that of one hundred and sixteen cases, twenty-six were both objective in the disorders and mobile in temperament and twenty-six were of low mobility and had exclusively subjective disorders. Of the moderately impulsive sixteen had objective disorders, and of the moderately impulsive also eighteen had purely subjective signs. The mean square contingency was .68.

Social rapport is a matter which receives serious consideration in one's dealings with difficult children, for it is noticeable in the microcosm of school and home in different ways and in the limited social world of the child. Temperament again plays a part and appears to determine the possibility of social contacts. Mobility or freedom from physiological and psychic load or inhibition must affect the child's power to establish contacts. Of 110 cases in which Sociability was related to Mobility, seventeen cases were both highly sociable and mobile of temperament, whereas thirty-six were of low mobility and definitely asocial, twenty-six cases were moderate in the social rapport and average in mobility. The correlation here was .7 approximately.

VI.—GENERAL CONCLUSIONS.

Enquiries have for some time past been made into the subject of temperamental tests with a view to establishing type distinctions.

Raymond B. Cattell, in a detailed enquiry,* comes to the tentative conclusion that there are established two factors "c" and "w" and their resultant pairs of type opposites which confirm in general terms the introvert, extrovert and antimony. The "c" type, however, he does not wish to identify too closely with introversion, and he is seeking for another term such as "Surgent-Desurgent" type of temperament. He adds, however, that "it would be necessary to discover the exact limits of the traits concerned in estimates and just how far the thing estimated expresses itself in test situations or precise records of behaviour." In my enquiry, an attempt has been made to deal with the subject, as far as children are concerned, from this point of view.

By the use of the mean square contingency coefficient, pairs of traits were correlated. Sociability with Movility correlated .7. Subjective or objective symptoms with Impulsiveness correlated .68. Subjective with objective symptoms correlated with Mobility .5. Mobility correlated with Impulsiveness .5. Impulsiveness with Persistence correlated .23, and Impulsiveness with Prudence .3.

If one studies the distribution of the figures in these series of correlations, what emerges as an indication, if not an assertion, is the existence of two fairly circumscribed reaction types: (1) the mobile—impulsive—sociable, frustrating rebellious type; and (2) the atonic—low impulsive, asocial psychoneurotic child. But further analysis shows that there is a subjective type, of low mobility, who is given to sudden impulsive outbursts. This type of child is not given to rebelliousness but to bad temper alternating with psychoneurotic reactions—relapsing into isolation and torpor, and its mental output gauged by intelligence tests is low. Mobility, as we noted above, correlated .34 with the I.Q. (Binet-Simon scale).

On the physiological and morphological plane, correlations are difficult in the present state of our knowledge of reliable tests in children at least of types of physiological function. Descriptively alone it was quite noticeable that the psychoneurotic of low mobility was of poor physique and poor stance. The scapulæ were frequently winged, the skin inelastic, the expression lacked lustre. The impulsive mobile and behaviour child was very frequently robust, had a defiant stance, a good torso and a healthy elastic skin. Careful measurement, however, on Kretschmer lines, using Wertheim's morphological index, did not bring out striking groups of longilinear or brachialinear forms. The enquiry does not claim to give anything more than indications of distribution of temperamental

* See article on "Temperament Tests."—*Brit. Jnl of Psych.*, Vol. 23, Part III.

types amongst the forms of disorders of children, but the indications are sufficient to show that the reaction types so clearly defined in the psychiatry of adults are already making their appearance when we study children who have not yet reached or have just entered the years of puberty.

SOCIABILITY.

MOBILITY.

	+	0	—	Totals.	
+	17	9	0	16	.75208 .12347
0	7	26	9	42	.04861 .24152 .02857
—	0	6	36	42	.02090 .6857
	24	41	45	110	1.90085

$C = .7$ approx.

SYMPTOMS.

SUBJECTIVE—OBJECTIVE.

IMPULSIVENESS.

	+	0	—	Totals.	
+	45	9	2	56	.5928 .0761 .0019
0	16	10	18	44	.0916 .1196 .0968
—	0	0	16	16	.4270
	61	19	36	116	2.0158

$C = .68$ approx.

SYMPTOMS.

SUBJECTIVE—OBJECTIVE.

MOBILITY.

	+	0	—	Totals.	
+	26	2	0	28	.4023 .0080
0	22	13	12	47	.1716 .2000 .0800
—	12	3	26	41	.0585 .0120 .4339
	60	18	38	116	1.3663

C= .5 approx.

MOBILITY.

IMPULSIVENESS.

	+	0	—	Totals.	
+	26	18	12	56	.389 .1309 .0647
0	5	24	13	42	.0192 .3323 .0006
—	0	0	15	15	.3750
	31	42	40	113	

C= .5 approx.

PERSISTENCE.

	+	0	—	Total.	
+	4	4	27	35	
0	1	7	4	12	
—	0	1	0	1	
	5	12	31	48	

IMPULSIVENESS.	+	$\frac{4^2}{35 \times 5}$ ·091	$\frac{4^2}{35 \times 12}$ ·038	$\frac{27^2}{35 \times 31}$ ·672	·801	$C = \frac{5-1}{5}$
	0	$\frac{1^2}{12 \times 5}$ ·0166	$\frac{7^2}{12 \times 12}$ ·3404	$\frac{4^2}{12 \times 31}$ ·0431	·4001	$C = \frac{2 \cdot 2011 - 1}{2 \cdot 2011}$
	—	0	$\frac{1^2}{1 \times 12}$	0	2·2011	$C = \frac{1 \cdot 2011}{2 \cdot 2011}$
						$C = \cdot 23$

PRUDENCE.

	+	0	—	Total.	
+	3	19	12	34	
0	2	13	1	16	
—	0	0	0	0	
	5	32	13	50	

IMPULSIVENESS.		$\frac{3^2}{34 \times 5}$ ·053	$\frac{19^2}{34 \times 32}$ ·331	$\frac{12^2}{34 \times 13}$ ·328	·712	$C = \frac{5-1}{5}$
		$\frac{2^2}{16 \times 5}$ ·05	$\frac{13^2}{16 \times 32}$ ·330	$\frac{1^2}{16 \times 13}$ ·005	·385	$= \frac{1 \cdot 097 - 1}{1 \cdot 097}$
		0	0	0	0	$= \frac{097}{1 \cdot 097}$
		1·0			1·097	$= > \cdot 3$

RÉSUMÉ.

LES DIFFÉRENCES DE TEMPÉRAMENT DANS LES DÉSORDRES DE COMPORTEMENT CHEZ LES ENFANTS.

On fit une enquête sur les traits de tempérament se cachant derrière les désordres de comportement et psychonévrosiques chez une centaine d'enfants. On fit les observations dans une Clinique d'Enfants organisée de sorte que le problème présenté put être étudié à la lumière de l'intelligence de l'enfant, de son milieu social, de son comportement et ses succès à l'école et de ses réactions pendant les jeux, par groupes et solitaires. Trois traits principaux furent examinés indépendamment par le médecin et le psychologue qui appliqua des tests de langage et de dextérité. Pour ce qui est de la mobilité et la persistance ces jugements indépendants s'accordent de très près, mais, pour ce qui est de la prudence, seuls les jugements du psychologue peuvent être considérés comme valables. Au moyen du coefficient carré moyen de contingence on établit la corrélation entre des paires de traits. La Sociabilité avec la Mobilité, corrélation, .7. Les symptômes subjectifs ou objectifs avec l'Impétuosité, .68. Les symptômes subjectifs et objectifs avec la Mobilité, .5. La Mobilité avec l'Impétuosité, .5. L'Impétuosité avec la Persistance, .23, et l'Impétuosité avec la Prudence, .3.

Ces corrélations qualitatives indiquent, si ce n'est qu'à titre d'essai, que le groupe d'enfants observés se divise en deux sections assez distinctes.

(1) Le type Mobile-Impétueux - Sociable-Frustateur-Révolté qui montre des désordres de comportement, et

(2) Le type Atonique ou asthénique peu Impétueux-Insociable ayant une tendance à des psychonévroses.

ZUSAMMENFASSUNG.

TEMPERAMENTSUNTERSCHIEDE BEI BETRAGENSSTÖRUNGEN VON KINDERN.

Man hat etwa 100 Kinder auf die Temperamenteigenschaften hin untersucht, die hinter den verschiedenen Betragens- und psychoneurotischen Störungen stehen. Man machte Beobachtungen in einer Klinik und richtete es so ein, dass das dargestellte Problem im Lichte der Intelligenz des Kindes, seines sozialen Milieus, seines Betragens und seiner Leistungen in der Schule und seiner Reaktionen während des Gruppen- und Einzelspiels studiert werden konnte. Drei Haupteigenschaften wurden unabhängig von einander von dem Arzt und von dem Psychologen betrachtet, welche Wort- und Leistungstests ausführten. Was die Beweglichkeit und die Ausdauer anbetrifft, stimmten diese von einander unabhängigen Schätzungen sehr genau überein; aber was die Klugheit angeht, so wurden die Schätzungen des Psychologen allein als zuverlässig angesehen. Unter Gebrauch des Mittelwerts vom Quadrat des Kontingenzkoeffizienten wurden je zwei der Eigenschaften korreliert. Geselligkeit korrelierte mit Beweglichkeit .7. Subjektive oder objektive Symptome korrelierten mit Erregbarkeit .68. Subjektive mit objektiven Symptomen korrelierten mit Beweglichkeit .5. Beweglichkeit korrelierte mit Erregbarkeit .5. Erregbarkeit mit Ausdauer korrelierte .23, und Erregbarkeit mit Klugheit .3.

Diese qualitativen Korrelationen weisen darauf hin, wenn auch nur versuchsweise, dass die untersuchte Kindergruppe in zwei ziemlich verschiedene Gruppen zerfiel.

(1) Der bewegliche-erregbare-gesellige-zerstörerische-rebellische Typus wies Betragensstörungen auf, und

(2) Der schlaaffe oder schwächliche, wenig erregbare, asoziale Typus zeigte sich zur Psychoneurose geneigt.

A STUDY OF THE COMPARATIVE INTELLIGENCE OF CHILDREN IN CERTAIN BILINGUAL AND MONOGLOT SCHOOLS IN SOUTH WALES.

BY ETHEL M. BARKE

(*From the Education Department, University College, Cardiff*).

- I.—*Object and origin of the investigation.*
- II.—*The Tests : non-language and verbal mental tests.*
- III.—*The Subjects : bilingual and monoglot schools.*
- IV.—*Results :*
 - (a) *Comparison of results in the bilingual and monoglot schools.*
 - (b) *Correlations of the tests with teachers' rankings for intelligence, with each other, and with Secondary Schools' Entrance Examination results.*
 - (c) *Comparison with results of other investigations.*
- V.—*Conclusions.*

I.—OBJECT AND ORIGIN.

THE object of this investigation was to compare the general intelligence of pupils of certain bilingual and monoglot schools in South Wales by means of non-verbal tests.

There are many degrees of bilingualism. In this paper the term "bilingual" is applied to schools in which the mother tongue is used almost exclusively with the younger children, but a second language becomes progressively the chief medium of instruction in the upper classes.

The conclusion drawn by Saer* from his extensive investigation was that the mentality of the bilingual children in rural districts of Wales was distinctly inferior to that of the monoglot English-speaking children in the same area, and he suggested that this inferiority was due to the confusion arising in the child's mind from the premature attempt to become bilingual. As against this, however, he found practically no difference in the intelligence of bilingual and monoglot children in urban schools; this he considered was due to the fact that the children in the towns (unlike the rural children) used English in their play before going to school as well as during school years, and therefore escaped to a great

* Saer, D. J., *An Inquiry into the effect of Bilingualism upon the Intelligence of Young Children*.—*J. of Exp. Ped.*, Vol. VI (1922), pp. 232-240 and pp. 266-274; also Saer, D. J., *The Effect of Bilingualism on Intelligence*.—*Br. J. of Ed. Psych.*, Vol. XIV (1923), pp. 25-38.

extent the emotional disturbance experienced by the rural children when they found they could not meet the demands of school-life with their mother-tongue alone. At the same time Saer detected evidences of mental confusion in the bilingual urban children when he gave tests of dextrality and rhythm, which seemed to indicate that they, too, had suffered a mental disturbance from the too early use of a second language.

In order to ascertain whether the effects of early bilingualism persisted, Saer gave group tests of intelligence to a number of university students* and found in their case also that rural bilingualists were inferior to rural monoglots.

Saer's findings were to some extent confirmed by Mr. (now Professor) Frank Smith,† though he attacked the problem from a different angle.

It must be noted, however, that, with the exception of the dextrality and rhythm tests, all the tests employed by Saer and Smith involved the use of language. It is true that Saer's examinations were conducted in Welsh or English according to the mother-tongue of the child, but even so the question arises whether the inferiority shown by the bilingual children in rural areas may not have been due to linguistic difficulties.

That early bilingualism need not in itself involve a lowering of intelligence is suggested by the results of an investigation of the comparative intelligence of Jewish and non-Jewish children,‡ though here the racial factor must be taken into account. Although linguistic ability may afford an indication of general intelligence, in estimating the intelligence of bilingual children, whose progress in the mother-tongue may have been hindered by the early introduction of a second language, it seems advisable to apply mental tests of a non-verbal character.

II.—THE TESTS.

The tests used in this investigation were of both the non-verbal and verbal types, viz. :

- (1) *Non-Language Mental Tests*, by R. Pintner, Ph.D.
- (2) *Northumberland Standardised Tests : General Intelligence*, 1925 Series, by Cyril Burt, D.Sc.

* Saer, D. J., op. cit., *Br. J. of Ed. Psych.*, Vol. XIV (1923), pp. 25-38.

† Smith, Frank, *Bilingualism and Mental Development*.—*Br. J. of Psych.*, Vol. XIII (1923), pp. 271-282.

‡ Davies, M., and Hughes, A. G., *An Investigation into the Comparative Intelligence and Attainments of Jewish and Non-Jewish School children*.—*Br. J. of Psych.*, Vol. XVIII (1927), pp. 134-147.

The Northumberland Tests being well known in this country need no description ; they comprise nine tests entitled respectively, Understanding Instructions, Opposites, Similarities, Mixed Sentences, Completing Sentences, Selecting Reasons, Simple Reasoning, Following an Argument, and Absurdities.

The time required for giving these tests is sixty minutes. This was the Group Test of Intelligence employed by Davies and Hughes in their investigation of the comparative intelligence of Jewish and Non-Jewish school-children, to which reference has already been made.

It was used in this investigation chiefly that it might serve as a check on the non-Language Test, and is not to be regarded as a suitable measure of Intelligence for the children in the bilingual schools.

Pintner's non-Language Mental Test has been used frequently in U.S.A. for comparing the intelligence of American children and those of foreign parentage, and for testing deaf children. Evidence of its reliability and validity has been adduced by Professor Pintner.* The test is not so well known in this country, though it was used by the National Institute of Industrial Psychology† in one of their experiments in vocational guidance.

The material throughout is non-verbal and calls for no verbal response, moreover the instructions are given entirely by signs and demonstrations on the blackboard. The material includes mutilated pictures, pictures with missing features, two digit-symbol tests (one easy, the other more difficult), and tests dealing with form relationships. The time required for giving this group test is thirty to thirty-five minutes. In every case before the Test was begun a brief statement was made to the children, explaining why no words were to be used, and indicating the signals for starting and stopping together with one or two other matters of general procedure. This statement had been drawn up beforehand in English and Welsh, and in the bilingual schools it was given in both languages.

A third test (Group Tests—series 34 of the National Institute of Industrial Psychology) was used with a group of boys and a group of girls who took the Pintner and Northumberland Tests a second time after the interval of a year. In this case two of the component tests are of the pictorial type, while the other seven involve the use of language ; thus

* Pintner, R., *Results obtained with the Non-Language Group Test.*—J. of Ed. Psych., Vol. XV (1924), pp. 473-483.

† Industrial Fatigue Research Board Report, No. 33, *A Study in Vocational Guidance.*

the test, as a whole, contains features of both the Pintner and Northumberland Tests, though inclining more to the latter type.

As regards the general question, whether perceptual mental tests measure the same general intelligence as verbal tests, opinions differ. If Spearman's* theory of "g" is accepted, then the reply is in the affirmative, and Performance Tests (suitably constructed) can be used as substitutes for verbal intelligence tests, as appeared in Davey's† investigation, in which the pictorial tests used were the exact counterparts of the verbal tests. On the other hand, there is Thorndike's‡ view "that the ability measured by the verbal tests is not the same as the ability measured by non-verbal tests" (he declares, however, that "the various intelligences" will inter-correlate), and Pintner§ says of his non-language test that it "may be considered as testing a less abstract type of intelligence than is tested by the usual verbal group intelligence test."

It should be noted that many well-known Performance Tests are reported by various investigators as not altogether suitable for measuring the intelligence of the older children, but this objection appears not to apply to Pintner's non-Language Test, since in it, generally speaking, older children score progressively higher than younger children.

III.—SUBJECTS.

For this investigation three mixed bilingual schools|| were chosen, which were situated not far apart in a mining district of South Wales where Welsh is the dominant language. The social environment of the pupils was of a similar nature in the three schools. The investigator noted that the children commonly spoke Welsh at play, and Welsh was the language usually heard in the shops. In answer to a questionnaire, 86·2 per cent of the children** replied that they spoke Welsh at home.

In this area all the instruction in the infants' departments is given in Welsh except when the children are taught English nursery rhymes; the time allotted to these varies from ten minutes a day in one school to ten minutes a week in another. In Standard I, that is at about the age of seven years, they begin to learn English systematically. In one of the

* Spearman, C., *The Abilities of Man*.

† Davey, C. M., *A Comparison of Group Verbal and Pictorial Tests of Intelligence*.—*Br. J. of Psych.*, Vol. XVII (1926), pp. 27-48.

‡ Thorndike, E. L., *Intelligence and its Measurements: A Symposium*, I.—*J. of Ed. Psych.*, Vol. XII (1921), p. 126.

§ Pintner, R., *op. cit.*, p. 475.

|| Schools A, B, and C in the tables of results.

** Excluding a few who failed to reply.

schools, for example, it was stated that the children read English for forty-five minutes a day, and had in addition English conversation or recitation for fifteen minutes. From Standard II English is the medium of instruction, but explanations are often given in Welsh, especially in the lower standards, and the teachers are bilingual.

The children tested were all those present in each of the three schools on the day of the examination whose ages were over ten years and under fourteen years. They numbered three hundred and ninety-five.

To compare with these, two schools* (for boys and girls respectively) were selected in a mining district of the same county where English is the dominant language. In these schools there is a compulsory Welsh lesson every day, but English is the medium of instruction in the other lessons. The language commonly heard in the playgrounds and shops is English. In answer to the question: "Do you speak Welsh at home?" only 3·4 per cent of the boys and 3·9 per cent of the girls† replied in the affirmative. The number tested was three hundred and two, all of the age range of ten to fourteen.

It was thought that from the point of view of the fathers' occupations these two groups of schools would compare very fairly, but it seems probable that the home environment of the pupils in the three bilingual schools was rather superior to that of the pupils in the monoglot schools; the investigator was informed that in the bilingual area, though wages were low, many of the miners owned the houses that they occupied, whereas in the other mining area selected it was stated that families moved frequently and that parents did not show much interest in their children's education.

IV.—RESULTS.

Range of I.Q.'s in the bilingual and monoglot schools.

The distribution of I.Q.'s for the verbal and non-verbal tests in the bilingual schools (354 pupils‡) and the monoglot schools (302 pupils) is shown in Figures I and II.

All the curves are skewed to the left, which was to be expected owing to the removal of the brighter children to the secondary schools before they reach the higher age groups.

The monoglot schools are seen to be clearly superior to the bilingual on the verbal test, but on the non-verbal test a slight advantage rests with the bilingual schools.

* School D (boys) and School D (girls).

† A few failed to reply.

‡ Owing to an unfortunate accident, figures for School C are not available in the 12 and 13-year groups.

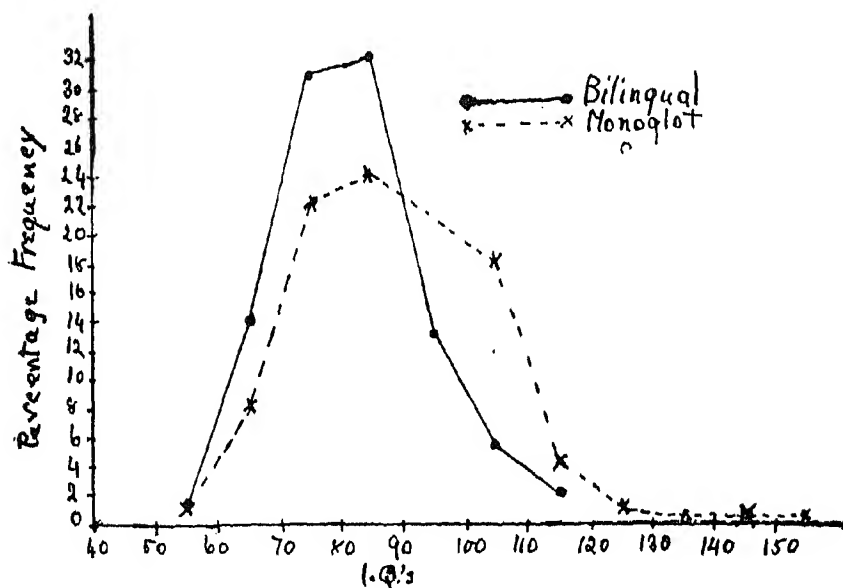


FIG. I.
NORTHUMBERLAND TEST. DISTRIBUTION OF I.Q.'s.
(VERBAL.)

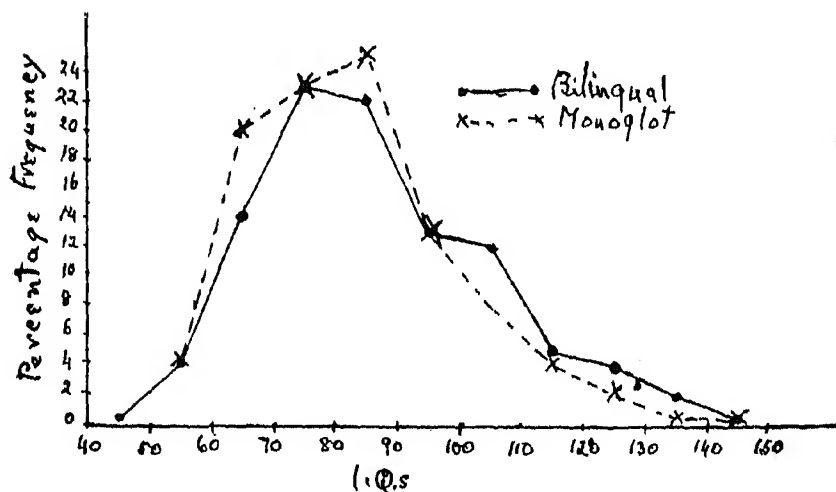


FIG. II.
PINTNER TEST. DISTRIBUTION OF I.Q.'s.
(NON-VERBAL.)

Comparison of mean mental ages in the bilingual and monoglot schools.

When the four age-groups are considered separately—see Table I (a)—and the mean mental ages are compared, the monoglot schools are superior in each case on the verbal test with an average superiority of $\cdot 8$ of a year, but on the non-verbal test it is the bilingual schools that are superior in each case with an average superiority of $\cdot 44$ of a year.

When a further division is made according to sexes—see Table I (b) and (c)—the results are slightly less consistent, probably because the groups are smaller and therefore less representative; even so, however, if the average is taken, the monoglot boys are found superior to the bilingual boys and the monoglot girls to the bilingual girls on the verbal test, but contrariwise on the non-verbal test.

Thus while on the verbal Mental Test the children from the bilingual schools appear to be inferior to the children from the monoglot schools, the results of the non-Language Mental Test point to a different conclusion.

Sex Differences.—It will be seen that the boys are distinctly superior to the girls on the non-verbal test. The writer would suggest that though there may be sex differences involved in the various constituents of the test, the inferiority of the girls is due in part at least to lack of interest in the material. It was observed when the tests were being given that the Pintner Test appeared to be much more popular with the boys than with the girls, who generally seemed to prefer the verbal test. Hence it may be that temperamental or emotional factors are largely responsible for the sex differences noted in the results of the tests, but the matter requires further investigation.

Comparison of results of the tests with teachers' rankings for intelligence.

In this investigation the children of each standard tested were ranked for intelligence by their class-teachers (it was found not practicable to have the ranking done for age-groups). Correlations were found, by means of Spearman's foot-rule, between the teachers' estimates and the tests, also the correlations of the tests with each other both by standards and age-groups. The coefficients of correlation varied from :

+ $\cdot 154$ to + $\cdot 678$ for teachers' estimates and Northumberland I.Q.'s (average, $\cdot 453$) ;

+ $\cdot 106$ to + $\cdot 473$ for teachers' estimates and Pintner I.Q.'s (average, $\cdot 282$) ;

+ $\cdot 114$ to + $\cdot 575$ for N.I.Q.'s and P.I.Q.'s (average for standards, $\cdot 351$; average for age-groups, $\cdot 408$).

TABLE I.
COMPARISON OF MEAN MENTAL AGES IN THE BILINGUAL AND MONOGLT SCHOOLS.

Age last Birthday in years.	Northumberland Test.					Pintner Test.				
	Schools A. B. C.* (bilingual)		School D. (monoglot)		Difference.	Schools A. B. C.* (bilingual)		School D. (monoglot)		Difference.
	No.	Mean M.A.	No.	Mean M.A.		No.	Mean M.A.	No.	Mean M.A.	
	(a) BOYS AND GIRLS.									
10	101	8.7	98	9.6	—0.9	101	8.8	98	8.7	0.1
11	112	9.4	74	10.5	—1.1	112	9.8	74	9.4	0.4
12	78	10.0	64	10.5	—0.5	78	10.75	64	9.8	0.95
13	63	10.1	66	10.8	—0.7	63	10.9	66	10.6	0.3
	(b) BOYS.									
10	50	8.6	35	9.75	—1.15	50	8.75	35	9.6	—0.85
11	51	9.6	31	10.4	—0.8	51	10.7	31	9.8	0.9
12	41	10.2	27	10.0	0.2	41	11.4	27	10.0	1.4
13	27	10.5	26	11.0	—0.5	27	11.3	26	10.75	0.55
	(c) GIRLS.									
10	51	8.8	63	9.6	—0.8	51	8.8	63	8.2	0.6
11	61	9.3	43	10.6	—1.3	61	9.3	43	9.2	0.1
12	37	9.8	37	11.0	—1.2	37	9.75	37	9.75	0
13	36	9.8	40	10.7	—0.9	36	10.7	40	10.3	0.4

* See note on page 241.

TABLE II.
SAMPLES OF CORRELATIONS OF RANKINGS BY PINTNER AND NORTHUMBER-
LAND TESTS WITH EACH OTHER AND WITH TEACHERS' RANKINGS FOR
INTELLIGENCE.

<i>Standard.</i>	<i>No.</i>	<i>Teachers' ranking with N.I.Q.</i>	<i>Teachers' ranking with P.I.Q.</i>	<i>N.I.Q. with P.I.Q.</i>	<i>Age in years.</i>	<i>No.</i>	<i>N.I.Q. with P.I.Q.</i>			
SCHOOL D.—BOYS.										
VII	20	·413	(·233)	·293	13—	26	·448			
VI	34	·678	·335	·470	12—	27	·456			
V	31	·318	(·106)	·368	11—	31	·531			
IV	31	·462	(·122)	·337	10—	35	·421			
SCHOOL D.—GIRLS.										
VII	31	·500	(·175)	·275	13—	40	·291			
VI	46	(·154)	(·171)	·316	12—	37	·211			
V	39	·486	·309	·407	11—	43	·506			
IV (a)	28	Not available			10—	63	·487			
IV (b) ..	30	·272	(·199)	·292	—	—	—			
SCHOOL A.—MIXED.										
SCHOOLS A., B., C., * COMBINED.										
						<i>No.</i>	<i>Boys.</i>	<i>No.</i>	<i>Girls.</i>	
VII	31	·419	·375	·356	13—	27	·488	36	·513	
VI	44	·606	·473	·479	12—	41	·407	37	·399	
V	40	·542	·242	(·114)	11—	51	·285	61	(·169)	
IV	25	·606	·308	·394	10—	50	·450	51	·464	

N.B.—A bracketed coefficient is less than three times its probable error and therefore without significance.

* See note on p. 241.

There is a fair amount of correlation between the teachers' rankings and the Northumberland Test, but the correlations between the same rankings and the Pintner Test, though positive, are low and in many cases insignificant. It is probable, however, that these rankings are based chiefly on the pupil's proficiency in academic subjects, and that the

teachers' idea of intelligence is not sufficiently comprehensive. That such is the case is indicated by the fact that there is a fair amount of correlation shown between the Northumberland and Pintner Tests in the age-groups (the age-group is a less selected group than the standard), and also by the comparatively high correlation found between the Pintner Test and the National Institute Test (see Table IV) in the case of the boys (as the girls tested were a smaller and more selected group the correlation coefficient in their case was naturally rather lower.) The correlation between the secondary schools' examination scores and the Pintner Test points to the same conclusion (see Table III).

TABLE III.

CORRELATIONS OF SCORES ON NORTHUMBERLAND AND PINTNER TESTS (1930) WITH EACH OTHER AND WITH SECONDARY SCHOOLS' ENTRANCE EXAMINATION SCORES (1931), OBTAINED BY THE PRODUCT-MOMENT FORMULA.

<i>Subjects.</i>	<i>No.</i>	<i>Secondary Schools' Entrance Examination with N test.</i>	<i>Secondary Schools' Entrance Examination with P test.</i>	<i>N test with P test.</i>
Boys from School D	35	.696	.568	.549
Girls from School D	37	.538	.486	.532

TABLE IV.

CORRELATIONS OF NORTHUMBERLAND, PINTNER, AND NATIONAL INSTITUTE TEST SCORES, OBTAINED BY THE PRODUCT-MOMENT FORMULA.

<i>Subjects.</i>	<i>No.</i>	<i>Northumberland with National Institute Test.</i>	<i>Pintner with National Institute Test.</i>	<i>Northumberland with Pintner Test.</i>
Boys from School D (the 11-year group)	35	.891	.840	.750
Girls from School D (the group subsequently described)	26	.770	.573	.595

N.B.—Each of these coefficients exceeds the Probable Error more than five times.

It may be noted that in the case of the boys (with the exception of the small twelve year group) the mean I.Q.'s in the Northumberland Test for the monoglot school correspond fairly closely to those found by Davies and Hughes* (with the same test) for non-Jews attending a school ("School B") "in a moderately poor district in East London"; the mean I.Q.'s of the monoglot girls are lower than those of the corresponding girls' school in London but slightly superior to those of a school ("School C") "in a very poor district in East London."

<i>Average Mental Ratios.</i>						
	<i>School B. (Lond.)</i>		<i>School C. (Lond.)</i>		<i>Monoglot schools in this investigation.</i>	
<i>Age.</i>	<i>Boys.</i>	<i>Girls.</i>	<i>Boys.</i>	<i>Girls.</i>	<i>Boys.</i>	<i>Girls.</i>
10	95	97	87	85	94	90
11	91	95	85	83	93	94
12	97	90	83	82	81	88
13	86	93	75	75	84	81

With regard to Saer's investigation, if we compare the median M.A.'s of his rural children with those of our boys and girls from the mining areas (as determined by the non-language test), whereas on Saer's (verbal) tests the bilingual children are inferior at each age to the monoglot children, the contrary is the case in this investigation when a pictorial test is used, as will be seen from the following figures.

<i>Saer's† Median M.A.'s.</i>					
<i>Physical Age (Years).</i>	7	8	9	10	11
Monoglots (rural)	7	7·8	8·3	9·4	10·2
Bilinguals (rural)	6·5	7·1	7·8	8·5	9·2
Difference (in favour of Monoglots)	·5	·7	·5	·9	1·0

<i>Median M.A.'s on Pintner non-Language Test.</i>				
<i>Physical Age (Years).</i>	10	11	12	13
Monoglots (mining area)	8·75	9·6	9·95	10·6
Bilinguals (mining area)	8·95	9·9	10·8	10·8
Difference (in favour of Bilinguals)	·2	·3	·85	·2

* Davies, M., and Hughes, A. G., op. cit., pp. 137-139.

† Saer, D. J., op. cit., *Br. J. of Ed. Psych.*, Vol. XIV (1923), p. 28.

These findings, however, are not necessarily contradictory. If the tests measure the same mental factor "g," it would still have to be ascertained to what extent success in each is determined by "g."

If, on the other hand, the tests measure different types of intelligence, then the findings of this investigation may be regarded as supplementary to Saer's. All that can be claimed is that we have here an indication that bilingual children will not prove inferior to monoglots (with a similar social environment) in an approved Intelligence test from which the linguistic element is excluded.

It may be noted, too, that there is not much difference between the median I.Q.'s as found by the Pintner test in the three bilingual schools and those which Saer got in the four rural Welsh-speaking districts, Saer's* median I.Q.'s being 86, 85.1, 83.5, and 82.3, and those on the Pintner test averaging out to 85.5, 80.2, and 86.0 in the three schools respectively. Thus Saer's average is 84.2 as against 83.9 on the Pintner test.

V.—CONCLUSIONS.

While it is not suggested that the Pintner non-Language Mental Test is as reliable a measure of the intelligence of the individual child as the Binet Tests (used by Saer), it is claimed that it is a fairly satisfactory instrument for comparing the intelligence of different groups.

Measured by this non-language mental test the children of three bilingual schools, of the ages 10-14, in a Welsh-speaking mining district appear on the whole slightly superior to the children of the same age-groups in two monoglot schools in an English-speaking mining district of the same county.

The results of this investigation apparently conflict with Saer's findings as to the "effect" of bilingualism on intelligence, but in view of the different nature of the tests employed, our results may, perhaps, be regarded as supplementary to his.

It is, however, indicated that, under conditions of bilingualism, intelligence tests of a non-verbal nature should be used in preference or in addition to those in which success is conditioned by linguistic ability.

The general inferiority of the children from the bilingual schools when measured by the Northumberland Test is doubtless to be attributed to language difficulties and in particular to their imperfect comprehension of the English Language.

* Saer, D. J., op. cit., *J. of Exp. Ped.*, Vol VI (1922), p. 267.

This raises the question whether the children from these schools are similarly handicapped when they pass to the secondary schools in examinations in which not only the comprehension but the active use of the English language is required.

The writer desires to express thanks to the Directors of Education and head teachers who gave facilities for testing in the various schools, to the Training Department students and the teachers who assisted in giving the tests, and to Professor O. Wheeler and Dr. Oates for helpful criticism.

RÉSUMÉ.

ETUDE COMPAREE DE L'INTELLIGENCE DES ENFANTS DANS CERTAINES ECOLES BILINGUES ET MONOGLOTTES DU PAYS DE GALLES MÉRIDIONAL.

On établit une comparaison, au moyen d'un test sans langage, et les résultats de ce test sont, en plus, comparés avec les résultats d'un test de langage (en anglais). D'après le test sans langage les enfants des écoles bilingues semblent, à tout prendre, légèrement supérieurs aux enfants des écoles monoglottes d'une région semblable (mines de charbon) bien qu'inférieurs d'après le test de langage.

On compare ces résultats avec les résultats d'une enquête antérieure, bien connue (celle de Saer), et on arriva à la conclusion que, pour les enfants bilingues (en tout cas), les tests de langage n'offrent point de mesure suffisante de l'intelligence, mais qu'ils devraient être complétés par d'autres n'exigeant pas l'emploi du langage.

ZUSAMMENFASSUNG.

EINE UNTERSUCHUNG DER VERGLEICHENDEN INTELLIGENZ VON KINDERN AN GEWISSEN ZWEISPRACHIGEN UND EINSPRACHIGEN SCHULEN IN SÜDWALES.

Ein Vergleich wird mittels eines nichtsprachlichen Intelligenztests gemacht und die Ergebnisse dieses Tests werden weiterhin mit den Ergebnissen eines Wortintelligenztests (im Englischen) verglichen.

Bei der nichtsprachlichen Prüfung zeigen sich die Kinder an den zweisprachigen Schulen den Kindern an den einsprachigen in einem ähnlichen (Bergwerks-) Gebiet im allgemeinen ein klein wenig überlegen, obschon sie beim Worttest nachstehen.

Die Ergebnisse werden mit den Entdeckungen einer älteren bekannten Untersuchung (der von Saer) verglichen, und man schliesst daraus, dass (wenigstens bei zweisprachigen Kindern) Wortprüfungen keinen genügenden Masstab für die Intelligenz bieten, sondern dass sie durch andere ergänzt werden sollten, die den Gebrauch der Sprache nicht verlangen.

CHILD GUIDANCE ON THE CONTINENT.

By C. L. C. BURNS.

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I.—INTRODUCTION.

THE following record of observations is compiled from a tour of various European cities lasting over a period of some ten weeks, prior to starting the Child Guidance Clinic in Birmingham.

It cannot pretend to give a full and accurate description of organization in all the various branches of Child Guidance, using this term in its broadest sense; apart from the limitation of time, difficulty arises from the fact that the terms used in various languages to express various activities in this domain do not always correspond in meaning, and that institutions and schemes of organization in different countries may be very similar but never exactly alike in their aim and scope. The value of a differential study lies rather in establishing the general tendencies and orientation as exemplified by different nations and individuals. The different psychology of nations produces different methods no less than that of individuals.

The differences might be described in terms of horizontal variations of nationality or race, penetrated by the vertical cleavage of individual minds, together producing a result which will be a compound of these two variants.

The difference in respect to nations will best be illustrated on the one hand by the description of work in Italy with its highly objective and

mainly psycho-technical approach, and on the other by the psychological, almost purely "affective," point of view of an Austrian or German individual psychologist.

It is an interesting question whether a country does not get what it needs, and whether or not the prevalence of "neurosis" and the need for "Psycho-therapy" is not greater for us and for Northern races in general than for Latin countries. This may seem a bold statement to make, but it is apparently a fact that there were fewer cases of war-neurosis among them, and it may be that their more objective or realistic approach to life and their earlier "adulthood" makes them less predisposed to this form of human ill; the stability of their family life may be an added factor. The generalization may be quite fallacious and is merely suggested.

The difference in schools of thought and method arise also from the line of approach from which they each start—whether mainly medical or mainly psychological. These are best illustrated in the case of Vienna, which is naturally the "Kultur-Kampf" of the different psychologies in Europe to-day. We find here four main schools of thought, with a fairly rigid separation between them: the more orthodox neuro-psychiatry of the University clinics; the Freudian; the Adlerian; and lastly, the experimental psychological school of the Böhlers, which approaches to the Behaviourist. The important difference to note, however, not only in Vienna but in other cities, lies between the neuro-psychiatric and the psychological approach. The former tends to stress the organic side and, no less, the hereditary basis of psychopathy and behaviour problems; it is therefore bound to a less optimistic outlook. The latter stresses to a greater extent the influence of the home environment and the possibilities which lie in training, explanation, and encouragement, even in the most apparently hopeless cases, and is more hopeful as to results.

Such is the impression at any rate that arises from the observation; firstly, of that group of clinics which are respectively directed by Professor Isselin in Munich, Lazar in Vienna, and Kramer in Berlin; and, secondly, of the many individual psychological clinics in these cities. It must be stressed, however, that this difference of outlook refers to *treatment* rather than to investigation, though treatment depends largely on diagnostic labels and what they imply. It is, however, probable that in time, the mutual influence of these different schools will produce more homogeneous lines of treatment, with less partisanship, and consequently less waste of effort and better results.

It must also be stated that the discussion of these divergent schools does not apply to work among mentally defective children, because here

the problem is more clear-cut and better established, and the training and schooling of these children shows a great similarity in different countries. There will be seen to be, however, a general distrust of standardized mental testing in the American sense, and this opinion was expressed by various psychologists—from Rome to Berlin.

If my record should seem to be coloured by an Adlerian bias, I may say that I started with no such bias and that it is from what I have seen and heard that I have acquired my respect for the "individual-psychological mind," at any rate as applied to the treatment of the "problem-child." There is always the danger that a school of thought should become too systematized, and should fail to realize its limitations. There is, perhaps, a tendency with the Adlerian school to overlook to some extent the differentiation of temperament and character in children, and to expect all children to be capable of almost any achievement, but this fault certainly lies on the right side of optimism.

Lastly, with regard to what may be learned as to our own needs, I would say that it is primarily the training of doctors, teachers, and social workers, but principally of teachers, in the principles of Mental Hygiene (or what is termed in German "*Heil-Pädagogik*" for which we have no exact term in English), and, of course, the extension of Child Guidance work, though not necessarily in the sense of fully equipped and organized units, for a great deal may be accomplished by an individual with no equipment at his disposal. None of the clinics visited could be said to correspond exactly or completely to the "triumvirate" organization of team work of a Child Guidance Clinic, though in most the general method and technique naturally tends to approximate to this in principle, and to lead to the same end. There is generally less investigation of the psychological environment in the home itself; not necessarily through lack of workers, but in some cases because this is considered to lead to a more divided and less direct approach, which may even hinder rather than help the work of the "psychiatrist."

Secondly, that there is a great need for homes of observation and treatment of "problem-children."

Thirdly, the possible value of special classes for backward and "difficult" children (though this is a somewhat different problem with very wide bearings) like the ones in Zürich. Generally speaking, the impression remaining is one of great enthusiasm and an ever-increasing activity in all the countries visited, in the field of the Mental Hygiene of childhood, an activity which is, alas, too often hampered in the Europe of to-day by harassing economic conditions.

II.—ITALY.

The key-note of Italian work with backward and psychopathic children would seem to be the vast degree of correlation which is attempted for each case, with an elaborate amount of investigation from every angle. A neuro-psychiatric clinic such as the one to be described, or *Professor Pende's* institution in Genoa, attempts to combine the function of a medical research unit, a laboratory of experimental and industrial psychology, and a school of pedagogy and social service. Most of the Child Guidance work in every form in Rome, and indeed in Italy, owes its inception to *Professor Sancte de Sanctis*, who started special schools thirty-five years ago and now runs the "*Clinica Neuro-psichiatrica Infantile*" as part of the Medical Faculty of the University of Rome.

This is a self-contained unit which includes two observation wards for about thirty boys and girls respectively and four laboratories, including bacteriology, psycho-pathology, bio-chemistry, photography, and cinematography.

The headings under which the child is examined are such as the following :

Complete physical examination, including anthropometry, dynamometric and spirometric measurements (with respiratory curves for those with speech defects).

Neuro-endocrine investigation, including pharmacological tests.

Secondly, mental tests, including Terman, Vocational and Educational tests. Character tests, including "Exploration of the Sub-conscious" by means of association tests, etc.

Tests for perseveration and fatigability.

Thirdly, Sociological enquiry, which is not very full, visits being paid to the home apparently only in some cases.

The leaving-age for school in Italy is fourteen but appears to vary with social standing, intellectual capacity, etc. Technical instruction and after-care are well organized. Education was placed on a new basis by the reforms of 1925, and an interesting feature is that each school year possesses a single text-book containing all the subjects allotted to that year, and these are uniform throughout Italy.

Of special interest are the small schools scattered over the Campagna and elsewhere for children of the peasants (*Contadini*), who live under very primitive conditions. A special approach is required ; in some cases even to induce their children to enter the school is a difficult matter. One of the chief educational methods is singing, which is taught by the "Justine Ward" method, with amazing results. The voice production, accuracy

of tone, and facility both of singing at sight and of composing are very remarkable. While the children were singing a Gregorian hymn, one small person was composing a song of her own on the blackboard, which was then sung at sight by the whole class ! Drawing, gardening, and agriculture are also important subjects used, and the children are taught a very beautiful orthography with special pens. These schools, as well as the special schools, are privately run with State aid.

The special schools are distinguished by smaller classes, individual teaching, longer terms, and a great deal of handicraft ; the one that was visited had a complete printing press as part of the equipment.

In each of these schools there is a clinic (called *Ambulatorio*) in which other children besides those attending the school can be seen by the psychiatrist.

Delinquents are counted juvenile up to the age of eighteen. According to the psychiatrist with whom I discussed the question, delinquents after being accused, but before being judged in the children's court, can be sent to an observation home for at least a week, when a very full report on home conditions, physical and mental condition, is prepared and presented to the judge at the trial. Very few are sent to reformatories apparently, and great reliance is placed on various social agencies, the whole tendency being to regard juvenile delinquency as a problem of Mental Hygiene rather than a penal one.

Genoa might appear to be an unlikely place in which to study psychological clinics, but it is here that we find the "*Istituto Biotipologico Ortogenetico*" ; a self-contained unit, forming part of the Medical Clinic under Professor N. Pende, with Professor Vidoni in charge of the psychological side.

Although dealing with a great variety of conditions both in children and adults it may be said to furnish an example of one form of " Child Guidance " where all aspects of the individual child are taken into account. Children are sent from schools, practitioners, etc., and notably from the *Balilla* or Fascist boy-scout organization, for the assessment of educational and manual capacity and character.

There are no less than sixteen rooms through most of which any one case may pass before a complete record is compiled. These include departments for :

- (1) Physical examination and anthropometry (which it may be recalled had its inception largely in Italy under Viola and De Giovanni).
- (2) Photography, Radioscopy, Cardiography.
- (3) Biochemistry and Basal Metabolism.

- (4) Psychology, including mental and psycho-physical tests of every conceivable kind. The apparatus (which is nearly all designed by Professor Pizzoli of Bologna) is of the most diverse and elaborate kind imaginable and includes very complete testing apparatus for prospective aviators and motor-drivers.

The nervous or maladjusted child (often spoken of here as *anormali falsi* or "false abnormals") are examined firstly physically, then psychologically as far as is thought necessary, by the usual intelligence tests as well as word association, drawing, hand-work, and by the elaborate machines above mentioned, while information is gathered from the parents and teachers, and in some cases visits are paid to the homes.

It will be seen that an attempt is made to effect a complete correlation of all factors for each individual case and that the more objective or experimental psychological investigation is very full, though there is less of the detailed and painstaking enquiry into the family environment which we know.

The impression made is that while the Institute is a daring and inspiring piece of work, there is a certain hastiness in judging results and a certain lack of critical verification. The development of ideas with regard to "types" is interesting in view of the influence of Kretschmer's work in this field in psychiatry generally.

Pende considers the individual to be, for illustrative purposes, like a pyramid with a "hereditary base" and four facets:

Morphology (or shape and size, internal and external).

Temperament (humoral, endocrine).

Character (instinctive and emotional life).

Intelligence (general and special).

His latest classification of physique is into two main types: *Longilinear* and *Brevilinear*, each of which is sub-divided into sthenic or strong and asthenic or weak, the "weakness" being mainly explicable on endocrine grounds.

The two main types would correspond to the Leptosomatic and Pyknic types respectively of Kretschmer, while he claims that his subdivision of each corresponds more closely to the reality. It is also claimed that this holds good to a great extent for children as well, however much they may change at puberty, and that the assignation of a type plays a part in the assessment of the child's make-up and potentiality.

There are two special schools in Genoa under the charge of Professor Vidoni. They are very similar to those in Rome and the influence of De Sanctis is manifest.

One of the schools was seen. Gymnastics to music and handicraft of all sorts and kinds seemed to be a strong feature. Professor Vidoni remarked to me that all this work in connection with the Mental Hygiene of Childhood was only beginning, but that more and more progress would be made in Italy as elsewhere.

III.—SWITZERLAND.

In Switzerland there is no one uniform system in the matter of schools, medical services, or juvenile courts, as all these are cantonal rather than national or municipal.

Zürich was the only centre investigated and the organization here is reputed to be the most complete. *Zürich* possesses the famous asylum of Kraepelin and Bleuler, and attached to this, but quite separate from it, is the "*Stephansburg Kinder-Haus*" or observation home for difficult and backward children up to fourteen years of age. Also a "poly-klinik" for out-patients, on Child Guidance lines.

The observation home is a pleasant house on top of a hillock surrounded by trees, with room for about thirty children of both sexes, and is looked after by a house-mother with various assistants (including a social worker trained in America).

The investigation and treatment is very much on Child Guidance lines except that intelligence testing is carried out by the two psychiatrists who are in charge; in addition, of course, full notes are taken by the teachers and those concerned in observing the children.

Here as in the out-patient "poly-klinik" high-grade feeble-minded children, who in addition are neurotic, are also included, forming about 30 per cent of the total.

There is a general tendency to lay more stress on heredity and organic factors than we do, and perhaps to underestimate the influence of environment. Physical treatment, especially endocrine, is also included.

The influence of Bleuler and the proximity of the asylum may explain the frequent diagnosis of psychopathic conditions in children when we should perhaps be content with a more hopeful label. We find in the report that cases are sub-divided into schizoid psychopathy, asocial psychopathy, schizophrenia, and other such refinements in diagnosis.

Dr. Lutz, who is in charge of the home, also runs out-patient clinics with a similar outlook in various other towns in the canton. His work is in close touch with the school medical service, the medical officers of which are responsible both for the normal and special schools and classes.

Children who are below normal in intelligence go to special classes attached to the ordinary schools, while some psychopathic or difficult

children are sent to the "Beobachtung-Klasse" (observation classes), of which there are two ; where the work is freer, more talking in class is allowed, etc. I was given the opportunity of seeing one of these classes at work and it seems a valuable system in the hands of the right teacher. About seventy children have passed through in five years, of which the majority are boys. They stay in this class from three months to two years and are sorted out for the ordinary class, special class, or institution.

IV.—VIENNA.

Vienna offers an unparalleled example of the new superimposed upon the old. Into the beautiful spacious town, with its baroque magnificence and former aristocratic manner of living, came the "*Gemeinde*" or municipality of Vienna, with its stark hygienic modern buildings, and its prodigal activity in social welfare, and especially in child welfare.

Child Guidance Clinics of every sort and kind abound in Vienna : there must be at least forty which could be brought under this description, of which about thirty are run by "individual psychologists."

Of those which are more "official" in character, and more of the "neuro-psychiatric" type, Professor Lazar's clinic and observation wards at the Kinder Klinik, may be taken as a type.

Psychopathic, backward and difficult children are examined by psychiatrists trained in educational work, and a few are taken in for observation and treatment. The examination includes intelligence tests, some of the Binet-Simon type, but mostly performance tests with Montessori material, etc.

As regards treatment, the main stress is laid on the new social orientation acquired by the children through being with other children and being assisted in various ways, but apparently not very much belief is entertained in direct psycho-therapeutic treatment of child or parent. The children who have been in-patients often come later of their own free will to spend the afternoon and re-acquire some of the influence of the clinic.

Here again one met with scepticism regarding standardized mental tests ; although the testing was marked on a graph and should therefore have been numerical in result, the idea of an I.Q. was not entertained.

Another important centre for research into the problems of child psychology is the Institute run by Professor Kark Bühler and his wife, Professor Charlotte Bühler.

It includes the Institute proper, where instruction and research are carried on mainly in connection with the schools, but the main part

of the work is done at the *Kinderübernahmstellung*, literally the "place-for-taking-over-children," which describes what it is, for here are brought hundreds of orphan, destitute, and ailing children for observation and disposal. There is room for over 200, and here they are kept for three weeks on the average, so that about three thousand pass through in the year.

It is with this material that much of the research in child psychology is carried on, and one is able to watch, through glass windows, the response of children from birth upwards to various experimental situations. One can hardly help feeling that it is almost too much like a menagerie.

The children may go from here to institutions, or to foster-homes which receive careful sociological-psychiatric investigation before they are accepted as such. The work so far carried on by the Böhlers is practically confined to normal children, but an interesting extension which has a bearing on psychiatric social work in the home is now starting: the study of family life in all its bearings by investigators who are to live with certain families of various types, who have naturally promised full co-operation, and trace the various influences which are forming the children's characters, to be correlated with the experimental study of the children themselves.

Coming next to the psycho-analytic school we find that there are only two centres for child-analysis, which is not done by the play-technique method. One of these centres, run by Herr Aichhorn, deals more specially with delinquents, and not wholly on psycho-analytic lines. Other psychiatrists and psychologists are also influenced of course by the psycho-analytical school, so it is difficult to estimate the degree of activity of the rival schools. There is, however, no question as to this division between the older school with a neurological-medical bias; the experimental school; the Freudian; and the Adlerian. The future alone can decide what degree of fusion or mutual extermination will result.

The Adlerian clinics (or "erziehungs-beratung") number about thirty and are content, as regards personnel, with a psychiatrist (or sometimes a teacher or psychologist merely) assisted by voluntary workers who combine secretarial and social work; as regards premises and material, any room, a table, and chairs, suffice.

Individual psychology is not easy to grasp in its essence, although apparently simple and superficial in its outlook and technique. It cannot be learnt from books and one must catch its "atmosphere" before one is convinced of the value of its approach. Although it takes cognizance of the multiple factors in a human personality, it looks above all to a

synthetic approach, it considers even physical disabilities as being "used," or overcome, so as to fit in with the "style of life," and therefore deliberately fights shy of multiple investigations, whether by intelligence tests or detailed social enquiry (by other people than the psychiatrist), because this means a division, which may nullify the attempt at unification.

One's attitude towards this system or method must depend to a large extent on one's temperament and one's philosophy of life. Yet it can hardly be gainsaid that it is the most optimistic, and the one nearest akin to "common-sense," the one, that is, with the least break from the tradition of the human race.

As mentioned in connection with Munich, the habit of the "open-clinic" before an audience depends largely on geographical conditions, i.e., the easy sociability of the South-Germanic child lends itself to this milieu, whereas the North-German or English child might not take to it to the same extent.

An interesting experiment is being tried out officially in one of the big State schools, where one hour a week is set apart in each class for the children to discuss their problems with each other and with the teacher, who is trained in individual psychology. I attended one such class of ten-year-olds (the first class of the Hauptschule) and what happened was in the nature of a very animated parliamentary debate on such questions as to whether a certain game which is played with buttons should be allowed or not: some of the boys described various methods of evading the eye of the schoolmaster in playing this game during class. The schoolmaster was present guiding the debate, in an inconspicuous manner, sitting among the boys. In this way it is sought to educate the boys to self-government and self-understanding and the idea is a promising one.

Among other social agencies which play a part in the upbringing of the Viennese child may be mentioned the many kindergartens, the wonderful Montessori school, and the "Horts," or play-centres, which are also a feature of post-war Vienna.

I heard the opinion expressed by one or two of the older generation that too much is done for the child outside the family, that the "Municipal-child" will be a problem in himself; but there is safety in the stability and strength of family-life in Austria and in the co-operation and friendly spirit which seems to prevail. The only tragedy to be feared is that the whole machinery should run down for lack of funds.

One of the eight special schools for feeble-minded children was seen and did not appear to differ to any great extent from any other special

school of this sort, except that the teaching material and method seemed to be more on old-fashioned lines than the schools seen in Italy and Switzerland.

The smaller children seemed to be of a slightly lower grade than is usual in such schools, but these get weeded out before reaching upper classes.

Apparently a great number are sent for observation and soon find their way back to normal schools. The director again expressed the opinion that this method of observation was a better one than that of testing, but it is difficult to gauge to what extent testing has been tried and found wanting, or not properly tried out at all. There are also schools for deaf and dumb, for partially deaf and for partially blind children.

Delinquency.

The age for the children's court is up to nineteen and the system resembles that in Germany except that the actual trials are more elaborate, as there are, in addition to the three judges on the Bench, a "Staatsanwalt" or prosecutor, and a defending official.

Two boys were seen being tried for repeated theft. Certain features which struck one about the trial were: that the accused was sent out while the prosecutor and defending officials made their statements, and that the judges then retired to consider their verdict. I was accompanied by a doctor of the individual psychology school who attends unofficially. Only some cases are examined by a psychiatrist, but a full report of home conditions, schools, etc., is obtained by social workers.

Many cases are saved from coming to court and indeed from breaking the law by seeking advice from the Beratungsstellung or "advice-centres" for young people, which were started four years ago by the present head of the Kaiser Ebersdorf industrial school.

This organization includes a panel of psychologists, doctors, teachers, and others, a list of whom is to be put up in all schools, who are ready at any time to listen confidentially to tales of woe from young people who either do not know how to solve their difficulties or are overwhelmed to the extent that they contemplate suicide. The latter problem has engaged the attention of the unit to a special degree during the last year and the number of suicides among minors has decreased in this year from four to one-half per cent of the total annual suicides in Vienna. The attendance at the centre is nearly one thousand yearly. (These figures are taken from a journalistic account, so may be open to correction.)

Similar centres are said to exist in Dresden, Zürich, Budapest, and other places.

The *Kaiser Ebersdorf* reformatory is a large home for over 300 boys of ages from about fourteen up to twenty. It is housed in an old Schloss which is being rebuilt—very gradually owing to lack of funds.

It struck one in many ways as being an excellent institution. Special features are the completeness of the case-records, which include observations based on vocational tests, psychiatric examination at the Lazar clinic, monthly report from the masters, and a life history obtained from the boy himself. Another striking feature is the amount of liberty allowed; those in the "free-group" go out on their own, to Vienna or out in the country, while the others constantly have outings with a master or guide. There is practically no truancy or punishment.

V.—GERMANY.

(a) *Munich.*

The Heckscher Clinic for mental disorders is a comparatively new one under Professor Isselin.

It includes a children's section with room for about thirty in-patients and also takes children who come for classes and spend the day. The Institution is run by nuns with the assistance of lay teachers.

This clinic, although not strictly speaking on Child Guidance lines, serves a useful function in giving medico-pedagogic treatment to a mixed bag of cases—of the sort who are liable to fall between the stools of a General Hospital and the Education Authorities—including M.D.'s of a slightly lower grade than those attending the special classes, post-encephalitics, and a few epileptic and nervous disease cases: the clinic also specializes in cases of speech-defect and special disability generally.

The psychologist, Frau Gräfin Kuenberg, expressed her views on mental tests in general, which she says have not gained ground in Germany so much among psychiatrists as among educationists.

She considers that "intelligence tests," especially those with fixed time-limits, bear a false relation to the type of condition causing retardation, and from the point of view of individual diagnosis and treatment are liable to do more harm than good. The whole child must be taken into account; every child is different and requires different forms of tests with different material; observation of work and play should be the key-note; standardization is wrong.

The Individual-psychology Clinic, under Dr. L. Seif, is a form of clinic like those met with in Vienna, and is on very different lines from the preceding. Dr. Seif is an ardent "individual psychologist" of the Adlerian School, although he had been working on these

lines before this school of thought took shape. He believes in the "open clinic" system: that is the parents first and then the child or children are interviewed before an audience of perhaps twenty-five or more people. One of the arguments in support of this method is that the "proletarian" children are used to hearing their own problems and family problems discussed freely in their presence, so that the scene is merely changed to one where the right view is taken of these problems and the encouraging aspect of their lives is stressed: where they and their parents are educated to harmony and encouragement rather than to conflict and anxiety. Also that the easy sociability of the South-German child lends itself to this public approach to its problems.

The teacher is generally present and gives a report of the child's school life. No special intelligence tests are carried out. A clinic of this type has certainly the merit of simplicity; a bare school-room serves its purpose, and little is kept in the way of records. Social visiting is done to some extent by volunteers trained by Dr. Seif and there is a weekly play-group in a private house.

Dr. Seif has an enthusiastic body of followers—doctors and teachers—who meet more than once a week for lectures, discussions, etc., which are generally prolonged by a further meeting in a café.

Delinquents attend the Children's Court from the age of fourteen to nineteen but are kept under the care of welfare organizations till twenty-one. The system, as in Switzerland, includes an "accusing judge" who sees the delinquents before they reach the Court and decides which are to stand trial, which are to be seen by a psychiatrist or practitioner, or which are merely in need of guidance.

The Court includes three judges, one of whom presides and wears official robes.

When I attended the Court there were about eight people present altogether, including a policeman in uniform. The case being tried was that of a youth accused of sexual misconduct with two boys aged about ten: one of the latter was being cross-examined in detail by the presiding judge, and the painful impression created by this kind of trial (in whatever country it may be) illustrates the need for prevention, and for psychiatric rather than legal treatment, but also the difficulty of avoiding legal procedure when a grave accusation of this nature has to be proved against the offending party, when the latter is more than a child. (The psychiatrist does not attend the Court and I was unable to gather how many cases are actually seen by him.) The welfare work for probation cases is obviously very active, and there are several institutions which are well spoken of. Apparently there is nothing corresponding to a

remand home. These institutions, however, also include destitute or orphan children.

The Clemens-Maria Kindersheim is for children from two to fourteen years old, divided into five sections, and includes a complete school organization. It is run, like most institutions in South Germany, by nuns assisted by lay teachers.

The children who require it are examined periodically by Dr. Luxenberger from the Psychiatric Institute, who also holds courses of instruction for the nuns and others.

The *St. Georg Heim* is a school outside Munich of the reformatory type for delinquent boys from fourteen to twenty-one, of which there are 180 in this institution. It is run by a missionary order of priests. The main feature is the teaching of trades, of which at least a dozen are taught, and also a complete model farm and dairy.

The whole place gave an impression of freedom and friendliness which was enhanced by an impromptu performance of singing and brass band.

The director is in touch with psychological teaching in Munich and deplored the fact that a psychiatrist visited his institution only twice yearly.

There is also a well-known observation and training home for girls at Kochel, some distance from Munich.

(b) *Berlin.*

Professor Kramer's Clinic and observation home is part of the psychiatric section of the Charité Hospital and is run on much the same lines as the Isselin Clinic in Munich and the Lazar Clinic in Vienna, that is to say, it is a neuro-psychiatric unit which studies children with organic nervous disorders as well as psychopathic states.

Professor Kramer expressed his views on Child Guidance Clinics in general and stressed the fact that this work is above all a personal matter and that a clinic must be of slow organic growth. He seemed to consider that clinics in America started off with too much organization and savoured too much of mass production.

An interesting development in his work has been the separation of the guidance or pedagogic part of the work from the medical and psychiatric investigation. The latter is done at his clinic and cases are sent on to the Beratungstellung run by Fräulein Van der Leyen. This "advice-centre" has in turn grown out of purely social welfare work and in connection with juvenile delinquency. (She has published an account of

her work for the years 1918-30 in the *Zeitschrift für Kinderforschung*, which is the organ of the group of clinics under discussion.)

This development is another sign of the tendency for treatment of psychopathic children to take a pedagogic rather than a purely medical form, which has become everywhere evident in latter years.

There is very close co-operation between the psychiatric clinic and the guidance centre and the system would appear to work very well.

Perhaps the most interesting feature of child-psychology in Berlin is the growing influence of individual psychology. Dr. Adler himself has been there for some time and I had the opportunity of meeting him, but I was informed from quite independent sources of his influence in Berlin. Such prominent pediatricians as Professor Finkelstein and Professor Meyer send their cases of difficult children to individual psychological clinics, and one of the chief school medical officers runs a clinic of this type.

At the *Waisenhaus*, which is an institution under Professor Meyer for orphans and for destitute or neglected children, a section is to be started for the observation and disposal of such children as may be termed psychopathic, and will apparently be largely influenced by Adlerian methods.

I had no time or opportunity in Berlin for seeing any special schools or homes but the organization does not differ materially from that in other places. In addition to special schools for feeble-minded there are special classes for difficult children rather on the lines of those mentioned as existing in Zürich.

The Children's Court is also organized on much the same lines as in Munich. One of the judges is an individual psychologist and increasing use is being made of guidance clinics for children from the Courts. Apparently the main idea in connection with juvenile delinquency is to avoid any judicial sentence as far as possible. Most cases are ordered "erziehung" or guidance in one form or another; not only the individual child but the whole family is expected to seek advice.

Here again the judge decides which cases appear to need psychiatric and psychological investigation.

Berlin is behind other cities with regard to homes for delinquents, so I was informed; in Frankfurt, for example, there are three observation homes (in addition to homes of the industrial school type), one for children under fourteen and two others for older boys and girls respectively. Most of the provinces now have such observation homes, often with a doctor attached; but these have only been instituted within the last few years.

VI.—HUNGARY AND CZECHO-SLOVAKIA.

With regard to the more outlying members of European nations there is in Budapest (the capital of Hungary) a flourishing institute of *Heil-Paedagogik*; and also a complete unit consisting of neurologist, psychiatrist and psychologist, which was formed at the request of the children's judge to help him in his work. So even in this city where there are said to be less "repressions" than almost anywhere else, this work is found to be necessary and is well advanced.

In *Prague*, the capital of Czecho-Slovakia, the *Bakulev* school was visited.

This was started years ago to enable children who were badly crippled to make the most of their capacities and astonishing results were obtained in the way of manual work—often done with the feet when hands were not available—and artistic achievement. Many vicissitudes had to be overcome and part of the time the school was broken up, but the children refused to leave their leader and tramped the country with him, barely able to support themselves. From this they were rescued by American help. The school has since been widened to include healthy children, who now form the majority. The creative and independent form of training in this school has important psychological bearings: it shows for one thing how all such movements depend upon the inspiration of some exceptional individual, such as Bakulev certainly is. The most striking of their artistic achievement is their singing, the beauty of which has to be heard to be believed.

It is interesting to note how here, as well as in the distant Campagna of Italy, singing is one of the main forms of training—such as it was in the days of the Greeks.

VII.—HOLLAND AND BELGIUM.

A Child Guidance Clinic was started in Amsterdam about three years ago by Dr. Tibout assisted by Miss de Ranitz, who was trained in psychiatric work in New York. Dr. Tibout has had training in experimental psychology and does her own testing. About 120 cases are treated annually, and public assistance is not afforded on the grounds that not a sufficient number of children can be treated by this method to make it worth while, so that it has to depend precariously on private funds.

There is also a small home for special cases and Dr. Tibout considers that the value of such homes lies in treatment rather than in observation; the latter she considers is generally made fairly completely by out-patient attendance alone.

Dr. Tibout is in close touch with most of the clinics in other countries which have been mentioned in this report. She was able to give me some information about the treatment of delinquents. One interesting feature is the existence of a special " children's police " who are more in the nature of our probation officers. Another is the distinction made between " civil " offence, e.g., being beyond control, and a penal offence ; for the former type of problem the delinquent remains a " juvenile " till the age of twenty-one ! Also a system of conferences between the judge and what would correspond to a probation officer, before the case is judged, has been instituted.

I would have wished to have ended this report with an account of the work at *Mol*, the well-known reformatory home near Antwerp ; unfortunately Dr. Rouvroy was away and I could not be shown round.

One gathers from his lectures and articles that the aim in view is a complete bio-psychological study of the cases, and that psycho-technical methods are largely used, i.e., to measure vital capacity, muscular strength and movement, co-ordination, various forms of intelligence and special abilities, etc., all with a view to suitable pedagogic and other treatment, and not merely for research or diagnosis.

The interesting feature from the point of view of this journey of observation is that here we see once more the Latin mind at work, for to find a parallel method and outlook we have only to turn back to the account of similar work in Italy.

So we see that, in the end, national differences and similarities play a great part in the orientation of psychology ; no less than in other branches of human activity.

This report ends with an extremely cursory glance at the smaller countries, but time was short, and in all the countries visited I have omitted far more than I have described.

In conclusion, I desire to express my thanks to the Commonwealth Fund and the Child Guidance Council in London, through whose generosity the journey was made possible ; and to the latter for permission to print this report.

RÉSUMÉ.

LA NÉVRO-PSYCHIATRIE INFANTILE SUR LE CONTINENT.

On fournit un rapport sur un voyage de dix semaines en Europe, entrepris dans le but d'étudier le progrès dans la surveillance et l'hygiène mentale, appliquées aux enfants,

On passa la plupart du temps en Italie, en Suisse, en Autriche et en Allemagne, avec de courts séjours à Prague et à Amsterdam.

On remarque que la façon d'approcher la psychologie varie non seulement d'après les traits de caractère nationaux, mais aussi selon que, l'approche se fait d'un point de vue médicale ou d'un point de vue pédagogique.

On décrit des cliniques de névro-psychiatrie infantile, des procédés employés dans des cours de justice pour enfants, et d'autres écoles et institutions.

On remarque des progrès considérables dans l'Hygiène Mentale dans tous les pays visités.

ZUSAMMENFASSUNG.

KINDERFÜRSORGE AUF DEM EUROPÄISCHEN FESTLANDE.

Es wird über eine Reise von zehn Wochen berichtet, die unternommen wurde, um die Entwicklung geistiger Fürsorge und Hygiene in bezug auf Kinder zu beobachten. Man besuchte hauptsächlich Italien, die Schweiz, Österreich und Deutschland, und blieb nur auf kürzere Zeit in Prag und Amsterdam.

Man merkt, dass die verschiedenen psychologischen Anschauungen sich nicht nur nach nationalen Eigenschaften unterscheiden; es hängt auch davon ab, ob man den Gegenstand vom Gesichtspunkt des Arztes oder des Pedagogen betrachtet.

Über neuropsychiatrische Polykliniken, über das Verfahren beim Gericht für Jugendliche, und über verschiedene andere Schulen und Anstalten in verschiedenen Ländern wird berichtet.

Grosse Fortschritte in geistiger Hygiene werden in all den Ländern bemerkt, die besucht wurden.

PROGRESS THROUGH A SECONDARY SCHOOL AS MEASURED BY SCHOOL MARKS.

By F. SANDON.

- I.—*Introduction.*
- II.—*The data available.*
- III.—*Term-by-term progress tabulated.*
- IV.—*Some difficulties in dealing with the data.*
- V.—*Tabulation by age and sex.*
- VI.—*Discussion.*
- VII.—*Age and sex differences.*
- VIII.—*An "age allowance" for school marks.*
- IX.—*Comparison of performances of sibs.*
- X.—*Changes in form orders with time.*
- XI.—*Correlation between intelligence test and school marks.*
- XII.—*Conclusions and Summary.*

I.—INTRODUCTION.

IN English Secondary Schools there is each year an enormous compilation of marks of all sorts. Yet of all this accumulated raw material apparently appropriate for the discussion of so many pressing educational questions remarkably little use appears to have been made for this purpose. This is unfortunate, for although the marks are often compiled according to very rough and ready methods, yet they should be of value in various ways. A technique has been devised below for utilizing these marks and applying sound statistical methods to their analysis, and the following pages represent a first analysis of the experience of a particular school. The school concerned is a mixed recognized day school, enrolling about 180 boys and 150 girls, and maintained with five others by an English city local education authority. Between them, these six schools, representing some 2,000 places, admit annually some 400 pupils (boys and girls in roughly equal numbers) from the 3,000 or so pupils of the city of each year of age between 10 and 12. In the competitive examination for admission there is a small age allowance.

II.—THE DATA AVAILABLE.

In the school in question, for each of the three terms of a year, an average mark is compiled for each pupil. This records as a percentage

the score for the pupil's work in the various subjects of the school curriculum on the basis of written homework, short questions on learning homework, classwork, and terminal head master's examinations. There is no standardization of marks in any way (as, e.g., suggested in I), save for "set" subjects where the pupils of any one form are re-classified, e.g., boys to metalwork, girls to cookery, or some to Latin and some to German. Since, also, terminal examinations have not been allowed for in the Easter averages for any pupil, a considerable fluctuation in any pupil's work might well be anticipated, as it is known that some pupils do better at examinations than at class work, and some *vice versa*. The marks recorded cover the period Autumn, 1926, to Easter, 1932.

Practically speaking, all pupils enter in the First Form. (There are only a very limited number of by-term admissions—mostly migrants.) The entrants are placed in one or other of two parallel forms, each of some fifteen boys and fifteen girls, and under the present organization are re-shuffled after a trial term into A (superior) and B (inferior) sections, to make the sections as homogeneous academically as possible. After that, the normal organization is annual in step promotion. Extra jump-a-year promotions are not possible. Demotions are extremely rare. Halts occasionally occur—twenty-five in the experience considered, of which thirteen represent a second year in the School Certificate Form. Transfer from A to B and B to A Forms takes place freely, as indicated, at the end of the first term, but is thereafter rare. The data dealt with include eighty-five cases of A to B transfer, and seventy-two of B to A; about half of each type is accounted for by the first term reshuffling; the others take place as necessary at various times in the school career (of usually five years for the experience here surveyed) for reasons of either pronounced superiority or inferiority in work or for disciplinary or other special reasons.

III.—TERM-BY-TERM PROGRESS TABULATED.

The average marks were recorded in the following manner:

Admitted—September, 1930 (referred to as the 1930 Lot).

Tom Pearce*—Age (on 31st July preceding entrance), 10.1.

Average marks in successive terms, together with forms: A64, A65, A68, A76, A74.

Of these, the first three are, of course, scored in Form I, the next two in Form II, but all with the same "lot" of fellow pupils. This gives rise to the following four pairs of values for earlier mark and successive

* The names are fictitious.

later one: (64, 65), (65, 68), (68, 76), (76, 74), and gives, therefore, four points on a scatter diagram or, alternatively, four entries in the double entry frequency table (Table I). From these four points we could compute the correlation between successive terms for that particular boy. Four values, are, however, far too few for sound statistical analysis, and we therefore tabulate for all the pupils all the pairs of consecutive values (earlier-term-mark and later-term-mark) and use this tabulation for calculating correlations, etc. This gives us the double entry Table I. If there were no consistency in any pupil's work as measured by the marks, then the correlation would, within the limits of random sampling, be zero. If there were absolute determinism and the marks were standardized, the correlation would approximate to unity. As the marks are not standardized, we should not expect a very high term by term correlation.

IV.—SOME DIFFICULTIES IN DEALING WITH THE DATA.

Before discussing the conclusions, one or two points arise in connection with the tabulation. In the first place, the marks chosen for the different arrays to make tables of workable size had to be determined. The marks, as already pointed out, were on a percentage basis. It was found possible to group all marks in the seven arrays, 17-26, 27-36, 37-46, 47-56, 57-66, 67-76, 77-86.

In the second place, although there is no attempt at standardization, yet it is known that marks in A and B forms are very likely given on different basis² and it may be possible to correct in part for this effect. Two tables were obtained, one for earlier mark in A Form and later in B (85 cases), and one for earlier mark in B Form and later in A (seventy-two cases). In both tables the A mark obtained by any individual was, in the long run, of the order 3 to 4 less than the B mark obtained by the same individual a term later or a term earlier. In both tables, also, the correlation earlier-later was roughly linear, and was of the order .4 to .6; this is really high, for it must be borne in mind that the transfer cases are those where a big difference in reaction to scholastic influences should be expected, the individuals considered suffering a violent change of environment, and thus more likely to vary (by slacking off, being spurred on to extra effort, and so on) from term to term than the ordinary pupil.

This preliminary tabulation indicates a rough difference between the ease with which any individual could score in the two parallel forms, and, in consequence, all B marks, e.g. x , have been adjusted to the corresponding A value by subtracting 3 marks to give, e.g., $x-3$ as corresponding A mark.

A third point arises in some cases. Consider the following case :

Bill Brewer. Admitted 1930. Age 10·9.

IB 48, IB 40, IB 41. IIB absent, IIB 47.

This boy was absent for one term, and we have no record for that period. In such a case we would record the earlier-later pair from the *two term variation* rather than the one term, entering our values here as : earlier 38, later 44. We have some forty cases of this kind out of 2,586, and one case where a three term change is recorded. This, again, as presumably the marks are likely to become more unduly discrepant with time, will tend to reduce the correlation.

Another entry gives us yet another point :

Joan Stewer. Admitted 1928. Aged 10·0.

IB 37, IB 28, IB 29 ; IIB 29, IB 59, IA 51 ; IIA 49, IIA 44, IIA 50 ; IIA 59, IIA, 59.

This girl was demoted after four terms from IIB to IB. The treatment of this record was, therefore, as follows : The first four scores contributed (34,* 25), (25, 26), (26, 26), three pairs of values, to the double entry table for 10·0 girls of the 1928 lot. The later entries contributed to the 11·0 girls table the following pairs (56, 51), (51, 49), (49, 44), (44, 50), (50, 59), (59, 59). The reason for the assignment of this girl to the 11·0 group is that she is now working with the 1929 entrants, and if she had started with them and worked through, her age would be recorded as 11·0 at entry.

This brings us to the last of our preliminary points, the classification by age and sex.

V.—TABULATION BY AGE AND SEX.

An earlier enquiry³ led to the conclusion that "of two boys who are equal half-way through the term, the younger progresses more rapidly and gets a higher total at the end of the term." Another investigation⁴ suggests that of boys and girls of equal (mathematical) ability at the beginning, the boys come on more than the girls. Further, different rates of educational development in boys and girls are indicated by some enquiries (such as⁵) into competitive secondary school admission examinations age allowance. These results suggested that a fuller enquiry on a larger number of pupils under more uniform conditions for some length of time would be valuable, and, in consequence, it was decided as a result of correspondence with Prof. Valentine in connection with stability

* This is the 37B mark adjusted to A standards by subtracting 3.

of work in schools (see, e.g., 6) to direct the present enquiry to find out how boys and girls of varying ages of entry progress through the school. For this reason, the term-by-term tabulation already referred to was made by sub-tables for the following groups of the population of our experience:

Boys.—Age (*at entry) 10·0 and under 10·4, 10·4 and under 10·8, 10·8 and under 11·0, 11·0 and under 11·4, 11·4 and under 11·8, 11·8 and under 12·0.

Girls.—In similar six groups.

The four-month classification was taken because we thus obtained groups of sufficient size and because experience⁵ suggests that there are certain characteristics *not simply expressed as* linear functions of age which differentiate 10·0 and 11·8 children from the rest. Thus the 11·8 girls of the 1926 lot accounted for half of the whole 1926 girls instead of one-sixth, and the 10·0 girls of the 1931 lot only one-fifteenth instead of one-sixth of all the 1931 girls.

The detailed term-by-term tables for the separate age groups are too extensive to print in full. A specimen one is as follows:

TABLE A.
Boys 11·4-11·7.

		<i>Mark in Earlier Term.</i>							<i>Total.</i>
		17 —	27 —	37 —	47 —	57 —	67 —	77 —	
<i>Mark in Later Term.</i>	17 —	—	1	—	—	—	—	—	1
	27 —	1	11	10	—	—	—	—	22
	37 —	—	6	28	16	2	—	—	52
	47 —	—	1	13	54	30	3	—	101
	57 —	—	—	2	30	37	5	—	74
	67 —	—	—	—	—	4	14	2	20
	77 —	—	—	—	—	—	1	—	1
Total		1	19	53	100	73	23	2	271

When all the twelve tables are combined, we have the following Table I for 2,586 earlier-later combinations.

* Or as modified as indicated on page 272.

TABLE I.
ALL CASES.

		Mark in Earlier Term.							Total.
		17—	27—	37—	47—	57—	67—	77—	
Mark in Later Term.	17—	10	12	2	1	—	—	—	25
	27—	7	66	88	10	—	—	—	171
	37—	1	66	332	194	13	—	—	606
	47—	—	16	187	452	199	6	—	860
	57—	—	—	11	197	341	65	2	616
	67—	—	—	—	5	77	138	21	241
	77—	—	—	—	—	1	30	36	67
Total		18	160	620	859	631	239	59	2586

VI.—DISCUSSION.

Table I above will at once be noticed as a typical one giving high correlation. Without any calculation, if the entries be treated as altitudes and the contours be drawn, e.g., 50, 100, 300 and 400, good approximations to similar and similarly situated ellipses are obtained. The major axis is, very approximately, the line giving equal marks in the two school terms. The two lines of means (mean later mark for specified earlier mark and mean earlier mark for specified later mark) are conjugate axes of the ellipses and indicate the usual feature of regression, i.e., that pupils with marks below (above) the mean in one term tend to increase (decrease) them towards the mean next term. The change is, however, slight, and still postponing our correlation computation, we may, by adding parallel to the diagonal (the major axis), summarize the table as follows :

CATEGORY CHANGES.

Up 2.	Up 1.	Stationary.	Down 1.	Down 2.	Down 3.
34	564	1375	579	33	1

The nett weighted change is -16 times width of category, spread over the 2,586 cases, the calculation being :

$$\frac{1}{2586} \{ 34 \times (+2) + 564 \times (+1) + 579 \times (-1) + 33 \times (-2) + 1 \times (-3) \}$$

This corresponds to a decrease in the mean of $\cdot 062$ marks. Practically the mean is stationary. There are two points to observe in connection

with this : (1) A few very unsatisfactory cases were superannuated, and thus there was a slight weeding-out in the weakest categories. Thus, if the later term mark were such as to call for this action, there would be no next entry in which this final mark would appear as an earlier term mark. Further, when such drags on the form were removed, the class would become more homogeneous, and the teachers would, I think, react by unconsciously adopting a finer discrimination and tending to scatter the marks over the reduced lot ; (2) A certain number of pupils who were "tired of school" and anxious to get posts outside slacked off a lot in their last term or so. Thus we have one girl :

Lot 1926, 11·8. Successive marks : 79, 73, 79, 76, 73, 78, 68, 70, 67, 62, 62, 55, left.

This is not greatly to be distinguished in its effect from the other case.

TABLE II.

Sex.	Age Group.	Individuals	Entries	Later Mean Mark m_l	Earlier Mean Mark m_e	Increase $m_l - m_e$	Later s.d. σ_l	Earlier s.d. σ_e	σ_l/σ_e (to 3 d.p.)	Correlation r_{le}
Boys	10·0 —	18	85	50·32	49·62	+·71	10·22	9·88	1·035	·68
	10·4 —	30	195	52·12	52·12	0·00	10·11	9·59	1·054	·74
	10·8 —	36	242	51·95	51·79	+·17	12·07	11·66	1·035	·81
	11·0 —	45	296	56·84	57·21	—·37	12·73	12·42	1·025	·84
	11·4 —	46	271	52·16	52·64	—·48	10·71	10·82	·989	·76
	11·8 —	44	312	55·22	55·96	—·74	11·05	10·79	1·024	·73
Girls	10·0 —	13	86	43·36	41·97	+1·40	11·26	10·10	1·114	·73
	10·4 —	17	101	52·89	52·19	+·69	12·75	12·29	1·037	·84
	10·8 —	35	217	51·73	50·85	+·88	11·25	10·63	1·059	·77
	11·0 —	34	199	52·50	52·66	—·15	11·60	10·94	1·060	·81
	11·4 —	35	209	49·78	50·06	—·28	11·40	10·80	1·056	·77
	11·8 —	48	373	52·52	52·73	—·21	12·64	12·54	1·008	·84
Boys	Total	219	1401	53·68	53·94	—·26	11·57	11·37	1·018	·79
Girls	Total	182	1185	51·26	51·08	+·18	12·17	11·79	1·033	·81
All	Total	401	2586	52·57	52·63	—·06	11·91	11·64	1·02	·80

Values given to two decimal places. The Class Index Correction has not been applied to the correlations.

When we compute the constants for the table (see Table II) we have, checking the result already given, an alteration in the mean of $-.06$. The s.d.,* however, also changes, and we observe that the s.d. of the "later" distribution is greater than that of the "earlier." This is significant, and is found in each of the fourteen term-by-term tables, excepting only boys 11.4, where the "later" s.d. is .99 that of the "earlier." We may note how this difference arises if we examine the two marginal frequencies of the big table. We have

Array.	17 —	27 —	37 —	47 —	57 —	67 —	77 —	Total.
Earlier	18	160	620	859	631	239	59	2586
Later	25	171	606	860	616	241	67	2586

In other words, on the whole, pupils below the average fall off still more with time, and those above go up still more. Thus, of the 800 odd below the modal array (47 —) there are fourteen more in the earlier 37 — array than in the later, and eleven more and seven more respectively in the later 27 — and 17 — arrays than in the earlier, suggesting that these fourteen have sunk one or two categories and some others even more. The interpretation of these facts thus appears to be two-fold: (1) teachers make their mark scheme more sensitive, and certain pupils "ease off" unduly, both features already commented on; (2) exposure to educative influences has the effect of accentuating individual differences, of making the educationally advanced more advanced and the educationally retarded (speaking relatively to secondary school standards) more retarded.

One other statistic of this table calls for comment here. The coefficient of correlation of later term's mark with earlier term's mark, is .8023, with an s.d. of .0070. This is large, and significant, and is a remarkable result. It measures the resemblance between the marks of individuals

* The s.d. or standard deviation, usually denoted by σ , gives a measure of the scatter of any "population," of individuals, measurements, etc., from the mean. Roughly two of every three cases will lie within a range of $+\sigma$ and $-\sigma$ on either side of the mean.

In any sample there are errors due to sampling, and all our measures are thus estimates, subject to various errors. These errors are measured by standard deviations, and the odds are 2 to 1 (i.e., the probability is $\frac{2}{3}$) that the true value lies within the range (estimated value $+$ its s.d.) and (estimated value $-$ its s.d.); the odds are 20 to 1 that it lies within the range (estimate $+$ 2 times s.d.) and (estimate $-$ 2 times s.d.). This rule is only approximately true if the sample is small, i.e., if terms of order $\frac{1}{N}$ can be neglected in comparison with those in $\frac{1}{\sqrt{N}}$ (say, if the sample is less than 225).

in two successive terms, and is of the same order as that between the lengths of the long bones of the human body. It means that more than 50 per cent of the individuals remain in the same category, a particular range of 10 marks for two successive terms, and this in spite of missed terms, superannuation, demotions, terms without examinations, end-of-school-life-slackness, and other features which, as already pointed out, would tend to decrease the correlation; and in spite of the fact that there is no attempt at standardization of the marks. This can arise if and only if

- (1) the individuals work consistently;
- (2) the teachers mark consistently.

These two conclusions can, alternatively, be put as follows. The evidence indicates that in spite of fluctuations of pupils' efforts, due to variations in will, in health, in domestic ties, and so on, the performance of any pupil one term hence can be quite closely predicted from his performance this term. The evidence further indicates that a class is a unit, and the teacher in his mark system unconsciously adapts his standard of marking and of discrimination to the class, so that although his marks are on a relative basis and not comparable to other groups, yet, in the long run, the marks are comparable one term with another for this class; the class marks are for this class on a quasi-absolute scale. It is only because the class marks are quasi-absolute that we can justify the procedure of lumping together the earlier-later experience of all the various pupils in all their various forms to give us tables such as I.

The correlation obtained, of order .8, is high, and it is of interest to note how it affects a comparison of marks of individuals separated by a longer period. The material is not sufficient for a full analysis, but there are forty-three cases (of 11.8 pupils—boys and girls) where we have records for a three-year progress, e.g. from Summer, 1927, to Summer, 1930, etc. These cases give the following table:

		<i>Earlier Marks.</i>					
		37 —	47 —	57 —	67 —	77	<i>Total.</i>
<i>Mark Three Years later.</i>	37 —	4	5	2	—	—	11
	47 —	3	4	4	2	—	13
	57 —	1	3	7	4	—	15
	67 —	—	—	—	1	1	2
	77 —	—	—	1	1	—	2
<i>Total</i>		8	12	14	8	1	43

The material does not warrant the computation of a correlation, but it is worth noting that of these 43, 16 remain in the same category, 14 go down 1, 4 down 2, 7 up 1 and 2 up 2. This gives a nett weighted change of down 11 or an average of $\frac{1}{4}$ grade apiece. This decrease is slight, and, bearing in mind the observations on page 274, the effective steadiness of any pupil's marks over this period is confirmed.

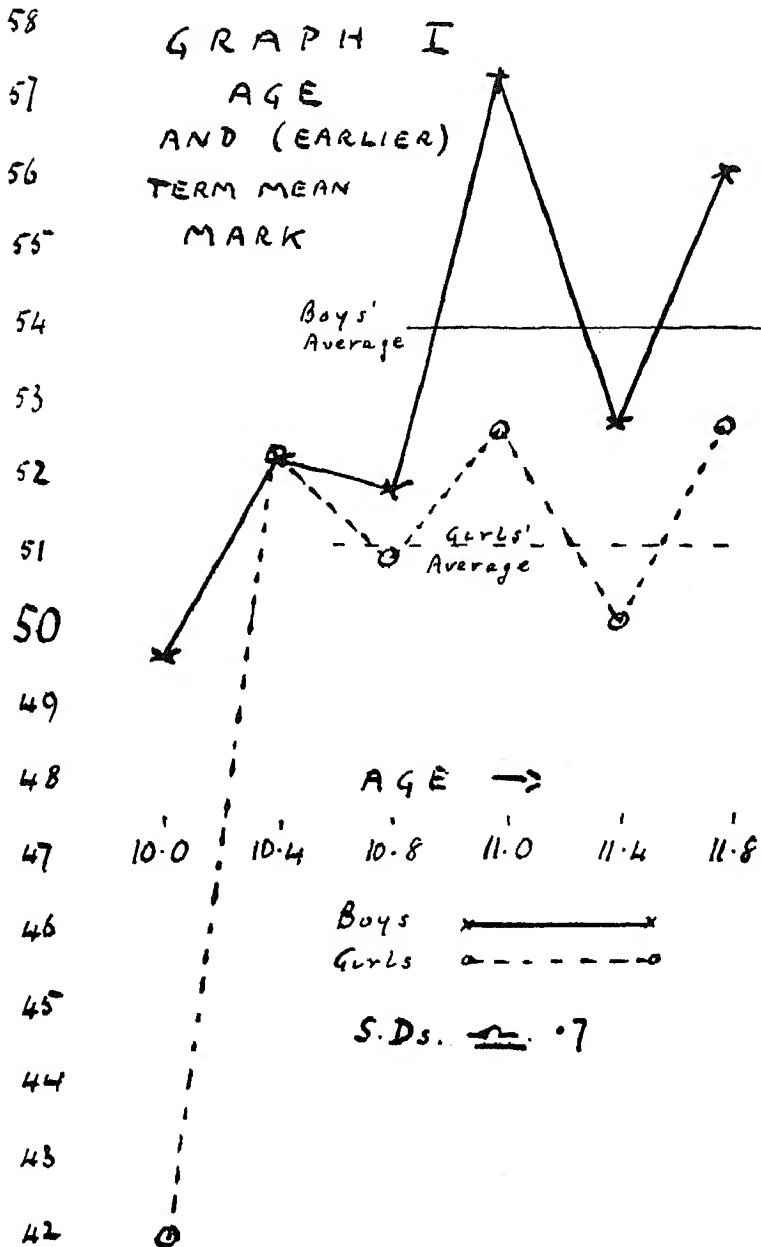
These results may be compared with those given by Professor Valentine⁶ (Appendix Ig, page 180) for correlations between high school "orders" of about '79 when a five-year period was observed.

VII.—AGE AND SEX DIFFERENCES.

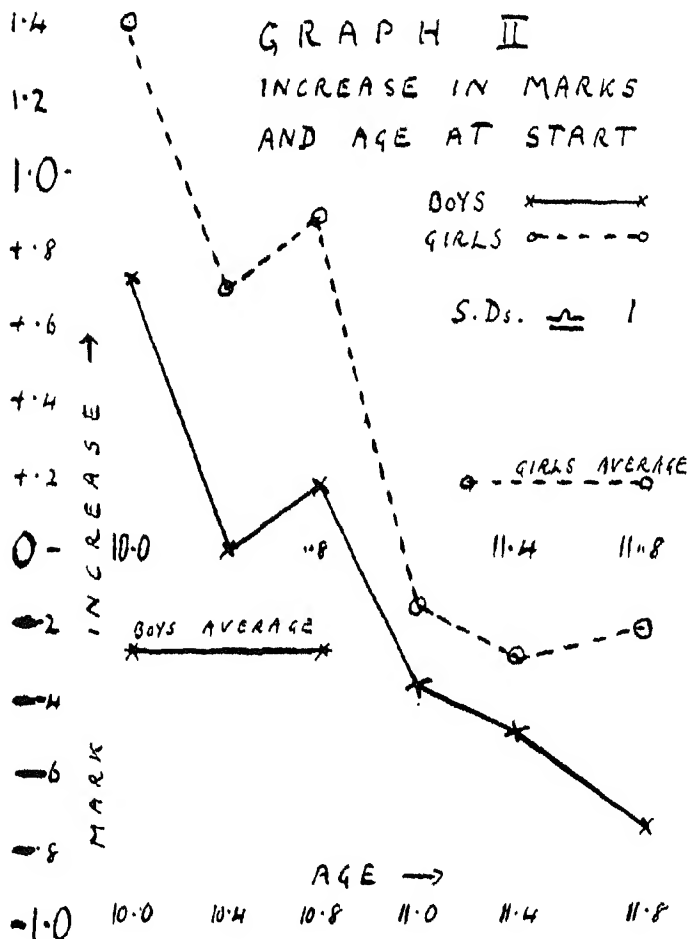
Table II gives us various statistics for the different populations that we are considering. We have already (page 272) commented on the varying number of individuals in these populations; it was an observation of a comparable feature that turned the author's attention to age allowances in secondary school entrance examinations⁵. The number of entries in the records per individual fluctuate round about 6·5; there is an excess of the oldest groups (11·8), both of boys and of girls, due largely to the same above-noted fact, the excess of old entrants being particularly noticeable in the earlier lots considered, where no age allowance had been granted. Thus, of the 29 girls of the 1926 lot studied, one half (14) were of the group 11·8, and these, of course, contributed a heavier number of entries to Table I than did the later entries.

Let us consider the mean mark and take first that for the "earlier" term. These are plotted on Graph I: for greater clarity in reading the points are joined by straight lines, continuous for the boys, broken for the girls. In reading Table II and the graph, we should recall that the measure of this mean is subject to sampling error. As σ is of order 10 and n lies between 85 and 373, the s.d. of the mean is of order $\frac{10}{\sqrt{85}}$ to $\frac{10}{\sqrt{373}}$, say between 1 and ·5, or something less than 1 mark. For *all* of one sex, it is of order $\frac{11}{\sqrt{1200}}$ or say ·3. For the 10·0 girls the mean is definitely low; there are, however, only 13 girls concerned. Of these, five are 1928 entrants, two of whom, in the course of their school life, were demoted to go with the 1929 lot. If we bear these points in mind we realize that there are significant features about the means.

(1) the boys average two marks more than the girls;



- (2) the older boys are about one mark better than those four months younger, the continuous line graph inclining upwards at about this gradient;
- (3) but that the older girls score about the same as the younger girls.

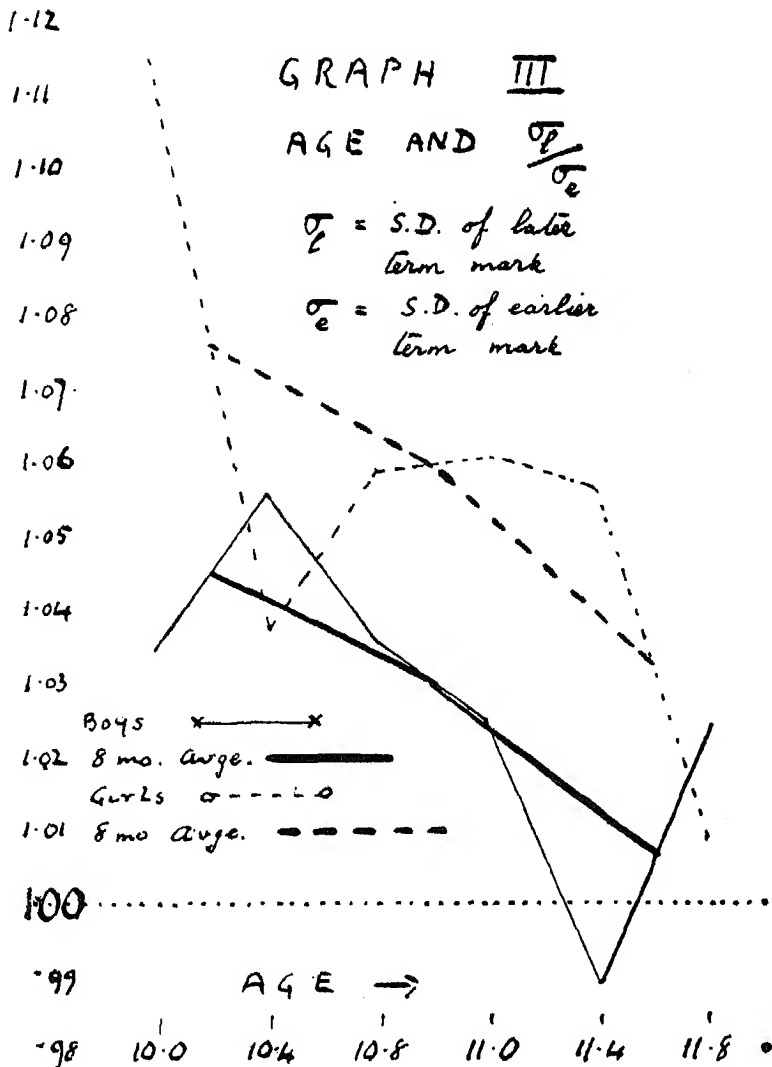


When we turn to study the gain-in-marks (measured by $m_1 - m_2$) we can draw Graph II. The s.d.'s of this measure are given by

$$\sum^2 = \frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2} \text{ i.e., of order } 2 \times \frac{100}{200}$$

so that Σ is of order 1. The differences are all (with one exception—the 10.0 girls already specially discussed) less than this, but the graphs certainly suggest

- (4) the younger pupils go up and older go down, so that each group overhauls the group four months older than itself at about .3 marks each term, this being approximately the average gradient of the two lines ;



- (5) the girls go up more than the boys. This may be in part a regression effect due to feature (1) ;
- (6) possibly the younger (10·0-10·11) girls as a group are more capable of forging ahead than the older eleven-year-old ones, or than the boys as a whole.

When we turn to examine the s.d.s., we take first those of the earlier set. These all range round about 10 to 12 ; there is no particular law observable, though

- (7) possibly the girls have a slightly larger scatter than have the boys ;
- (8) and possibly there is a slight increase in scatter with age. Neither of these two features is, however, clearly in evidence.

A study of the change in the scatter (measured by σ_1/σ_2) leads to more definite conclusions (see Graph III).

- (9) the scatter increases as the pupils stay at the school—the one exceptional case, 11·4 boys, has already been referred to on page 276 ;
- (10) this increase is more pronounced for girls than for boys ;
- (11) and it is more pronounced for the younger entrants.

Considering lastly the correlations we observe that they run to the order of ·8. The s.d. for sampling errors is therefore of order $\frac{1-\cdot64}{\sqrt{n}}$ or say $\frac{\cdot36}{18}$ or ·02.

Further, as the coefficient of correlation gives a measure of the resemblance between the marks of individuals in two successive terms, a high value, as already pointed out (page 276), indicates partly that the teachers' scheme of marking is stable and partly that the pupil is working steadily at maximum effort, or the same definite fraction of it. If the pupil is spasmodic, sometimes trying hard and sometimes slacking, the value of r will be reduced. Bearing these observations in mind we conclude that there is no law clearly established, though it appears that

- (12) the term-by-term correlation is greater in the case of the girls than of the boys ;
- (13) the term-by-term correlation increases for the younger boys but falls off for the last two age groups.

Taking, then, these thirteen conclusions, we may, I think, summarize the evidence in the following way :

- (α) On admission, the older boys do better than the younger ; the younger ones are, however, the brighter and overhauled the older

ones steadily term by term. These younger boys progress more steadily than the older ones, and the increasing effort differentiates them among themselves more and more clearly. There are a number of older boys who work spasmodically, and whose effort falls off with lapse of time.

- (β) In the case of girls there is not the same difference in ability of the different age groups as there is in the case of boys, though the boys as a whole score more heavily. Both these are features found in Entrance Examinations. The younger girls are, however, the brighter; they overhaul their older sisters at much the same rate as do the boys. As a whole, the girls work more steadily and consistently than do the boys, the abler girls particularly striving hard all the time to reduce the boys' lead.
- (γ) Education has the effect of accentuating individual differences, of making the educationally advanced more advanced, and the educationally retarded more retarded (speaking relatively to secondary school standards). The change of educational environment seems desirable at an earlier age for girls than for boys; other studies have indicated that girls respond more to their environment than do boys, and young girls seem to adapt themselves better to secondary school environment than do older ones.

VIII.—AN "AGE ALLOWANCE" FOR SCHOOL MARKS.

In entrance examinations an age allowance is commonly granted to equate as far as possible candidates of different ages. The underlying theory is much the same as that of the Intelligence Quotient, which it will be recalled, is defined as

$$\text{Intelligence Quotient} = \frac{\text{Mental Age}}{\text{Chronological Age}}.$$

We may try a similar idea for our marks as a measure of educational age. Suppose a mark z be indicative of an educational age y , the relation being of the form

$$z = ay + b, \text{ } a \text{ and } b \text{ being constants.}$$

Then, if two pupils this term have ages x and $x+1$ and a mark z , their educational quotients are respectively $\frac{y}{x}$ and $\frac{y}{x+1}$. These are assumed to be constant, so that next term when their chronological ages are $x+1$ and $x+2$ (for convenience, computing ages in terms), their

educational ages, being chronological ages, multiplied by educational quotient, will be $(x+1)\frac{y}{x}$ and $(x+2)\frac{y}{x+1}$ and their marks (assuming them to be on a quasi-absolute basis) will be $\frac{a(x+1)y}{x} + b$ and $\frac{a(x+2)y}{x+1} + b$

These, subtracting, will now differ by $\frac{ay}{x(x+1)}$. But we have found that the terminal gain in marks decreases approximately linearly from +.4 for the youngest boys to -.8 for the oldest (by fitting a straight line to Graph II), i.e., the younger boy gains on the one year 8 months (or 5 terms) older at almost 1.2 marks per term, or roughly $\frac{1}{4}$ mark per term for each term's difference in age.

$$\therefore \frac{ay}{x(x+1)} = \frac{1}{4}$$

$$\therefore a = \frac{1}{4} \frac{x(x+1)}{y}$$

To evaluate this we note that approximately the ages are those of a pupil half-way through the school course or, say, 13 years or 40 terms, and thus

$$a \simeq \frac{1}{4} \times \frac{40 \times 40}{40} \simeq 10$$

and the marks are given by $z = 10y + b$. Every excess of 1 term in age gives the older pupil a lead of 10 marks.

We obtain a result of similar order by proceeding another way. There are eleven cases of demotion in the course of the school career other than "halts" in the school certificate form. Taking arrays as before we have the following:

ARRAYS GAINED AS A RESULT OF DEMOTION.

Arrays gained	0	1	2	3
Cases	1	2	6	2

The average is $\frac{20}{11} = 1.8$, or 18 marks.

The effect of making a pupil work in a "lot" one year younger is to increase his mark by 18.

These two results give some indication of the order of magnitude involved; the former gives 30 and the latter 18 as the annual age allowance in a form. We may note that this is approximately twice the

standard deviation (10 to 12) and thus, in any form, the great majority of pupils above the average mark would not obtain a creditable mark in the form above. This is as anticipated, for, properly speaking, no age allowance based on educational quotients can be justified, for however capable a pupil, if he has not been exposed to the educational environment of a higher form, he cannot be expected to score the marks showing a mastery there. Age allowances are granted in open examinations because it is assumed that over a number of schools the educational quotient there is an approximation to the I.Q. This assumption is hardly valid in one school.

IX.—COMPARISON OF PERFORMANCES OF SIBS.

We may, however, use this "age allowance" to investigate the correlation between the performance of sibs. A pupil, John Smith, in Form IA had a mark 73 for his first term. His brother, William Smith, was in that form at that educational stage at a chronological age of three months less. He had 68. If he had been there at the same age he would have had $68 + 3y$, where y is the age allowance of marks per month. Approximately y is 2, and we thus have 73 and 74 as corresponding marks of the two brothers. These can be tabulated, and with all the sibs of the experience we can form a correlation table. There are only 63 cases in all, but these give a value for r of $\cdot 8659$. The s.d. of this is $\cdot 0315$, so that we have a very high and significant fraternal correlation for school marks.

Alternatively, we could calculate r in terms of y and then determine y to make r a maximum, but there are too few cases for any reliance to be placed on this method. The value of r above, in fact, must not be used as more than indicative of a high positive correlation, for clearly the correlation between sibs' performances is not really likely to be higher than that between successive performance of the same individual.

X.—CHANGES IN FORM ORDERS WITH TIME.

One other application of our results is in the study of the alteration of a form with time. Our earlier results may be summarized, using linear smoothing (*vide* Graphs I, II, III).

Boys.	Earlier Mean.	Term's Increment.	σ_t/σ_e	σ
10.0	50	+ .4	1.05	11
11.8	56	— .8	1.00	11

Take 10 boys entering the school aged 10.0 and distributed in ability, according to the normal law. Call then $A, B, C \dots$. Then we have

Boy.	A	B	C	D	E
Decile .....	.5	1.5	2.5	3.5	4.5
Deviate (σ)	1.645	1.036	.675	.385	.126
Boy.	F	G	H	K	L
Decile	5.5	6.5	7.5	8.5	9.5
Deviate (σ)	-.126	-.385	-.675	-1.036	-1.645

Their original marks, taking mean as 50 and σ as 11, are therefore: 68.1, 61.4, 54.2, 51.2, 48.6, 45.8, 42.6, 38.6, 31.9.

After nine terms the mean has increased by $9 \times .4 = 3.6$ marks and σ has become $11 \times (1.05)^9 = 22.87$, so that new marks are: 81.7, 71.3, 65.1, 60.2, 55.7, 51.5, 47.0, 42.1, 35.9, 25.5.

Suppose, also, 10 boys, $a, b, c \dots$, aged 11.8, had entered the form at the same time, with abilities similarly distributed. Then we have:

Boy.	a	b	c	d	e
Deviate	1.645	1.036	.675	.385	.126
Original Marks	74.1	67.4	63.4	60.2	57.4
Marks after nine Terms	66.9	60.2	56.2	53.0	50.2
Boy.	f	g	h	k	l
Deviate	-.126	-.385	-.675	-1.036	-1.645
Original Marks	54.6	51.8	48.6	42.6	37.9
Marks after nine Terms	47.4	44.6	41.4	37.4	30.7

Thus the order of merit of these 20 boys was at first: $a, A, b, c, B, d, e, C, f, D, g, E, h, F, G, H, k, K, l, L$; and was finally: $A, B, a, C, D, b, c, E, d, F, e, f, G, g, H, h, k, K, l, L$.

In other words, if each boy worked steadily and was marked consistently the younger pupils would come on so much 22 places between them. In actual practice, of course, as above seen, the mark of any pupil is not absolutely determined by his age and earlier record (if it were, the correlations found for each sub-table would be 1), but the result

is illuminating about the fluctuations in form ranking due to age. At no stage in a form of mixed ages will the ranking be that of the E.Q.'s of the individuals, so that a true age allowance cannot be obtained, as already indicated on page 285. A corollary is that no school ranking could correlate perfectly with an entrance examination in which an age allowance is included (see Valentine, page 183), or with such an examination without an age allowance (this last being equivalent to the true ranking of different aged individuals at a time different from that of the determination of the school marks).

XI.—CORRELATION BETWEEN INTELLIGENCE TEST RESULTS AND SCHOOL MARKS.

In view, however, of the wide range of the forms considered in our study (chronological ages differing by two years, educational ages of pupils of same chronological age fluctuating above or below their average by about one year), it might be thought that the entrance examination or some similar data might give some rough guide to the ultimate ranking. Valentine has dealt with the former criterion and it would take us too far to pursue this matter here. But it is of interest to note that the majority of entrants of the school for our enquiry for the past three years have taken the Spearman's "Measure of Intelligence" (Methuen's) Test after their selection. The results of this test compared with their form marks after one term are given in the following table, adapted to obtain a rough ranking of the pupils in order of ability.

		School Marks.							
		17—	27—	37—	47—	57—	67—	77—	Total.
Spearman I.T. Marks.	75—	—	—	—	1	—	—	—	1
	85—	—	—	2	1	3	—	—	6
	95—	—	—	10	8	3	—	—	21
	105—	1	1	7	19	3	—	—	31
	115—	—	3	13	23	13	3	—	55
	125—	—	3	7	17	11	5	1	44
	135 .	—	—	2	3	4	4	—	13
Total		1	7	41	72	37	12	1	171

The correlation is clearly very small. Actually, it is found that neither the Intelligence Test Marks, the Intelligence Quotient, nor the Entrance Examination gave any reliable guide to the appropriate form allocation ; whereas, after one term's trial in IA or IB, a mark was obtained that gave a very definite indication of whether the pupil was an A or a B pupil. This is borne out by the fact that demotions (25), A to B transfers (85) and B to A transfers (72) account for only 182 earlier-later cases, against the 2,586 of same form cases, and these demotions include School Certificate halts, and transfers include the Christmas First Form reshuffling. It would take us too far afield to investigate this matter now, but it may be pointed out that on the evidence of this paper it seems safer to choose as secondary school pupils sibs of those who have already made a success in such a school than to select pupils by any other test !

This is an illustration of the principle suggested in relation to entrance examinations for secondary schools (7), that whatever test we select by the other tends to seem the better.

XII.—CONCLUSIONS AND SUMMARY.

(1) Term school marks are found to be useful for a study of the way boys and girls of varying age of entry progress through school.

(2) Marks in B Forms in the school considered are increased by an unconscious bonus of about three marks over those assigned to pupils of equal ability in " parallel " A Forms.

(3) Term by term progress was observed for 219 boys and 182 girls, giving 1,401 boys' cases and 1,185 girls' cases.

(4) The term-by-term marks correlate highly ($r=.8$, i.e., of order of correlation of the long bones of the human body) and result in more than 50 per cent of individuals remaining in the same category (particular range of 10 per cent marks) in two successive terms. Even after three years about 40 per cent are still in the same category.

(5) The older pupils at first average 3 marks per cent apiece more than the younger for each year's difference in age, but these younger ones catch them up at about the rate of 3 marks per annum.

(6) The longer pupils are at school the wider become their differences in mark-earning capacity ; educational influences increase natural differences in ability.

(7) This effect is especially noticeable in the case of those who enter the school young, though at entry they do not differ widely among one another.

(8) The girls of the mixed school in question average 2 marks (per cent) less than the boys. But the younger ones catch up as fast as do the younger boys.

(9) The girls differ more among themselves than do the boys, and this difference increases more with the length of their school life, this last feature being particularly noticeable in the case of those girls who enter at the lowest ages.

(10) Girls are more consistent workers than boys as a whole.

(11) A proportion of the older girls and a considerable number of the older boys are unable to keep up with the standards demanded of them.

(12) It is possible that girls should be transferred to a secondary school before the prepubescent dip in intellectual growth so that they may profitably develop throughout in a favourable environment. Transfer at 10+ years is indicated rather than 12—.

(13) There is an appreciable fraternal correlation in school marks : in fact, sibship is the surest criterion that we find for predicting success in the school.

(14) A suggestion is submitted that an appropriate quasi-age allowance within a form of the school considered is of the order 2 marks (per cent) per month. This indicates again that the younger entering pupils are much better fitted for secondary school work.

(15) There is a considerable range of educational quotient in any form, which is not detected by the entrance examination, nor by the Spearman Intelligence Test.

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³ *A Statistical Analysis of Some School Marks I—The Correlation with Age of Arithmetic Class Marks*, F. Sandon.—*Forum of Education*, February, 1925, Vol. III, page 24.

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RÉSUMÉ.

LE PROGRÈS DANS UN LYCÉE ANGLAIS MESURÉ PAR LES NOTES SCOLAIRES.

On propose une méthode d'utiliser les notes trimestrielles, calculées d'après les procédés ordinaires des lycées, pour examiner certains problèmes. De l'analyse des notes de 219 garçons (1401 chiffres) et de 182 jeunes filles (1183 chiffres) les conclusions suivantes s'imposent, parmi d'autres :

- (1) Il existe une corrélation élevée entre les résultats des trimestres successifs chez l'individu.
- (2) Les élèves moins âgés tendent à rattrapper leurs aînés.
- (3) Il y a une corrélation si élevée entre frères dans les notes scolaires que la parenté est le critérium le plus sûr pour prédire le succès scolaire.

On examine les effets variés des influences pédagogiques sur des élèves, différant quant à l'âge d'entrée, au sexe, à l'aptitude innée. On ne découvre aucun moyen sûr de prédire le succès (sauf 3 ci-dessus), mais l'entrée la plus jeune possible semble s'indiquer.

ZUSAMMENFASSUNG.

ZENSUREN ALS MASSTAB DES WEITERKOMMENS IN EINER ENGLISCHEN HÖHEREN SCHULE.

Eine Methode wird vorgeschlagen, wodurch man die im gewöhnlichen Schulgang gesammelten Semesterzensuren gebrauchen kann, um gewisse Probleme zu untersuchen. Aus einer Analyse der von 219 Knaben (1401 Neueintretende) und 182 Mädchen (1185 Neueintretende) gewonnenen Zensuren an einer Koedukationsschule ergaben sich u.a. folgende Schlüsse :

- (1) Es besteht eine hohe Korrelation zwischen aufeinanderfolgenden Semesterleistungen irgend eines Individuums.
- (2) Häufig holen die jüngeren Schüler die älteren ein.
- (3) Es gibt eine so hohe brüderliche Korrelation bei Schulzensuren, dass Blutsverwandtschaft das nächste Kriterium ist, um Erfolg in der Schule zu prophezeien.

Die verschiedenen Wirkungen von Lehreinflüssen auf Kinder verschiedenen Eintrittsalters, Geschlechts, und angeborener Fähigkeit wird untersucht. Keine zuverlässige Methode, um Erfolg vorherzusagen (ausser (3) oben), lässt sich entdecken, aber früher Eintritt scheint ihn wohl anzudeuten.

SOCIAL DEVELOPMENT IN YOUNG CHILDREN.

By SUSAN ISAACS. (Routledge. 15s. pp. 480.)

THIS important volume is the second part of the trilogy which Mrs. Isaacs has planned to utilize the material she accumulated during the existence of the Malting House School. The first volume dealt with the intellectual development of her children and showed how they progressed in reasoning and the pursuit of knowledge. This book is concerned with their social adaptation, their loves and hates, and their development, or rather lack of development, in what is generally called "decency." We feel that Mrs. Isaacs is chiefly interested in this latter point, and to this the greater part of the book is devoted.

In plan, the book falls into three main divisions : a verbatim record of certain sayings and doings of the children ; a theoretical interpretation of the mental processes underlying these actions ; and a short section of practical advice to parents. The actual records are of value in themselves, but they are less valuable when divorced, as here, from the record of the children's other activities. This Mrs. Isaacs herself feels, and asks us to keep in mind the records contained in her earlier book. But, try as we may, this is not always possible to do. We want to know just how large a part these quarrels, visits to the lavatory, threats, or sudden impulses to spit played in the daily life of the children. Not a very large part we gather, but the effect of page after page of such records, unrelieved by more than an occasional ray of friendliness, is to give the reader an impression of the school which is clearly quite unjust.

For the last part of the book we can have nothing but admiration. Mrs. Isaacs' wide experience and understanding of children makes her a most admirable guide in all practical matters. All her suggestions are good, but the one which will appeal most to teachers is her insistence on the value to the child of skill. The child wishes to be good, wishes to be powerful. The way to both these aims lies through the development of skill, and skill is the product of practice. The naughty child is so often the child who has never been allowed to do anything for himself, and therefore does not know how to accomplish his aims save by aggression. As such a child gains the skill he requires his unpleasant traits of character seem to melt away.

The central, theoretical section of the book will not be so readily accepted as the other two. Fortunately Mrs. Isaacs is not anxious for the ordinary practical teacher or parent to concern himself with such

theories. She even suggests that he had better act on her practical advice and leave the theories alone. In this she is very wise. The amateur psycho-analyst is a danger to all those, especially children, who come into contact with him; and the danger is all the greater because so many of the psycho-analytic theories fit the neurotic but seem very little applicable to the normal. This seems very much the case in the comparatively new field of the analysis of children.

Melanie Klein, on whose work Mrs. Isaacs bases so many of her views, stresses over and over again the extremely abnormal nature of the children with whom she had to deal. These were mainly children who were practically uneducable or quite unmanageable. In many cases they came of families with a definitely neuropathic history and had highly neurotic parents. They had, also, obviously, been extremely mismanaged at home. It is quite possible that many of the difficulties of these children were due to premature sexual development, thwarted curiosity about sex matters, most unwise threats by prying parents, or seduction by lustful and cruel nursemaids. It is a far cry to the intelligent, healthy, well-cared for little children who played about in natural rivalry in a Cambridge garden. The result is that the attempt to use theories based on one set of children for the interpretation of actions by the second seems rather pointless. Not even the most careful consideration can make this dark world of perversions necessary to explain the rather harmless and quite normal indelicacies of Mrs. Isaacs' children. The fact is that a child regards its excrements much as an animal does. They are a quite interesting part of itself. Moreover, the nursery training in cleanliness and regularity necessitates attention to the process and talk about it. The second stage is the shame imposed by adult standards, and when this shame is forced on a child too young there is bound to be the formation of a special state of mind which finds outlet in giggling, boasting, and effrontery; and this state of mind does not necessarily pass with childhood.

In a similar way the ambivalent attitude towards their parents, so frequently mentioned, is in no way confined to the child-parent relationship; it characterizes the mentality of the dependent towards the person who is indispensable to him; whether that person be parent, beloved, or even employer. It is as much the torment of the adult as the child. Catullus knew it in his dependence on a woman who abused her power,

Odi et amo. Quare id faciam fortasse requiris.

Nescio; sed fieri sentio et ex crucior.

There are very few adults who have altogether escaped this misery even after they have laid aside childhood.

The second point is of perhaps more importance. No one who has watched children carefully can doubt the early manifestation of the sex instinct. Children of no more than eighteen months will go through all the instinctive movements of flirtation ; and little girls of two years are as full of characteristically sexual vanity and desire for display as their mothers.

On the other hand, a curiosity as to the process of birth which shows itself at about three or four years is not necessarily sexual at all. It is part of the child's general attempt to understand the world. This is in part shown by the fact that the child's interest is mainly in the mother rather than in the father, or the union of the sexes. A child may not ask any questions as to paternity if the information he requires about maternity is given. Unless normal children are placed in very unfavourable surroundings they will not appear to be troubled by sex till they are far older, so long as they are given the information they require to help them to understand their surroundings. If there is confidence between the child and adult the child will ask his questions and accept the answers as naturally as information about any other matter. For the rest, it is the desire for power rather than for sex satisfaction which seems to dominate the small child's life. He is so small, so helpless, is so continually being controlled that it is no wonder that he attempts in all ways to assert himself. Hence the importance of skill for his development, his jealousies of his parents, his attempts to divide them so that one may be his ally against the other, or his blandishments and display of love to the chosen one. To make all this a matter of sex seems unnecessary in view of a child's actions among his own companions.

If the theory is hard to accept in general it is even harder to do so in detail. Many of the statements in these chapters appear very arbitrary when given baldly and without their supporting evidence. "I shall, for example, be evaluating their interest in engines as representing the children's phantasy about parents and the sexual intercourse of parents," page 209. Why? Has this symbol sprung into being in the unconscious since 1830, and what should one "evaluate" a child's interest in steamships and aeroplanes as representing? One could ask similar captious questions about a doctrine mentioned many times in the book, that a child goes through life with a sense of guilt because he bit his mother's breast just before weaning, when his first teeth came through, *e.g.*, "In each case (of children who would not eat) the prime psychological factor was the child's anxiety about oral aggression in sucking or biting the mother's breast, with unconscious phantasies of the irreparable injury this would do the mother," page 325. When the difficulties

in feeding due to this cause are said to date "practically from birth," one's belief is strained. It is to be doubted if the ordinary child has any more idea that it is hurting its mother than the puppy knows he is annoying you when it chews up your slipper in rather similar teething difficulties. One can attribute too much reasoning power to an infant under ten months.

There are many points of a similar nature all giving opportunities for discussion and presenting interesting points of view. Whether one believes the theory set out or not it is extremely valuable to be given the opportunity of considering it in so clear a form and applied to such unusually full and unselected material.

MARY STURT.

THE INTELLIGENCE OF SCOTTISH CHILDREN :

Published for the Scottish Council for Research in Education, (London : the University of London Press, Ltd. Price, 5s. net.)

THE survey which this volume describes forms one of the most ambitious projects which educational psychologists have hitherto ever contemplated or carried out. The results are of great importance. They have an obvious bearing alike on educational and on social problems. Both teachers and educational authorities require to know how intelligence is distributed among the school populations with which they have to deal ; and every civilized country requires to know what is the mental capacity of its inhabitants, how far they deviate in certain cases above or below the normal, and whether the general tendency is towards improvement or deterioration. During the war the United States of America succeeded in assessing the intelligence of nearly two million army recruits. More recently in this country a Joint Committee of the Board of Education and the Board of Control carried out an investigation upon the incidence of mental deficiency within a number of selected areas. With these earlier efforts in mind, Professor Drever suggested that the Scottish Council for Research in Education should undertake a mental survey in Scotland. The incidence of mental deficiency was the primary problem ; but it was quickly decided to take a complete cross-section of the whole community. Bold as this undertaking may seem, it has been entirely successful.

Throughout the country, all the children born in 1921, and therefore aged about 11 at the time of the inquiry, were examined by means of a group test. As a supplement, one thousand children, intended to form a random but representative sample, were also tested with the Terman Revision of the Binet Scale. The group test used was one which had been prepared by Professor Godfrey Thomson for a scholarship examination in certain English counties. It was revised and supplemented by a pictorial test intended to provide scope for the duller and more backward children.

The number tested amounted to nearly 100,000. One of the most encouraging features of the survey is the ready way in which schools and education committees responded. In spite of the extra burden of work which teachers and officials thus took upon their shoulders, ordinary schools, private schools, residential institutions, all willingly responded. A special debt of gratitude is due, first, to Professor Godfrey Thomson,

who, as chairman of the sub-committees on group-testing and on statistics, has evidently been responsible for some of the most valuable features of the whole work, and secondly to the International Examination Inquiry Committee for contributing to the cost of the survey and report out of their grant from the Carnegie Corporation.

The results are described in full ; and incidentally valuable hints are given, not only on the construction of tests for this purpose, but also on the statistical devices to be used in analyzing such data. The correlation between the results of the Binet test and the verbal score in the group test was highly satisfactory—·80 for the boys and ·76 for the girls. Hence we may take it that the group test provided an efficient measure of intelligence as ordinarily understood. The Binet test, the preliminary trials with the group test among English children, and what is called a background study in a special district where the test was applied to three complete age groups, together yield a trustworthy indication of the average mental age of the Scottish population. The group selected for the Binet test would appear to have been slightly above the average. But, making all allowances, the report concludes that the average mental ratio (or I.Q.) of the boys and girls is 100, and the standard deviation 17 for the boys and 16 for the girls. Actually the boys were nearly 3 points ahead in the Binet group, but practically identical in the verbal test. In the verbal test, however, it appeared that the boys were developing at this age a little more rapidly than the girls in the ability measured ; but various corrections proved necessary to allow for certain accidental influences. Considering the large number of children from rural districts, the fact that the average I.Q. is almost exactly normal is distinctly encouraging to the Scottish population. It has long been suspected that in general intelligence the range is slightly greater in the male sex than in the female ; but it is valuable to have this view so definitely confirmed.

Another problem of importance is the general amount of variability in the whole population, i.e., the size of the standard deviation. The figure usually accepted has been in the neighbourhood of 13 points or rather less. Investigations in London suggested a higher figure. The report now considers that a figure of 16 or 17 is by no means too high. If this suggestion be accepted, and if normal distribution be assumed, this would mean that 3 or 4 per cent. of a given age group were mentally defective in the sense of having an I.Q. of less than 70 points. The numbers officially "ascertained," including the "ineducable" pupils, amount to about 7 per thousand. The minimum proportion suggested by the actual data is "more than $1\frac{1}{2}$ per cent," a figure which tallies

almost exactly with that obtained from psychological surveys in London. In most rural districts in England the proportion would be undoubtedly higher than this ; but an estimate of 3 to 4 per cent is certainly unexpected. It is, of course, offered only as a rough and calculated approximation. Further, the distribution obtained, though roughly fitting a normal curve, suggests that on a closer view the distribution of intelligence may prove to be slightly asymmetrical.

Naturally, by means of a group test it is difficult to estimate exactly the level of individual children towards the lower end of the scale. As was almost inevitable, the picture test was not altogether satisfactory. It yields a correlation of about .3 with the verbal test in certain sample areas. Low as it is, such a coefficient, for a test of the pictorial type, is highly gratifying.

To determine the incidence of mental deficiency, however, a further census will be needed which should be based on individual testing and should include not merely verbal tests but also tests of a " performance " type. Nevertheless, the present survey already emphasizes the fact that low verbal intelligence (if this phrase may be used to describe the kind of ability required by the ordinary school curriculum) is distinctly more prevalent than is generally supposed.

It is difficult to praise too highly both the scheme and the results of the whole undertaking. Hitherto educationists in Scotland have had to depend on investigations in England or America for their assumptions regarding the distribution of general ability. Both the data and the conclusions will be not only of theoretical value to the psychologist and sociologist, but also of practical value to those in Scotland who have to interpret the results obtained by similar examinations carried out in schools or particular districts. The report, too, is of the first interest to every teacher and educationist, and, what is more, provides a solid contribution to the study of social problems.

CYRIL BURT.

BOOK REVIEWS.

An Investigation into the Relation between Intelligence and Inheritance:
By EVELYN M. LAWRENCE, B.Sc., Ph.D. (British Journal of Psychology Monograph Supplements. Cambridge University Press. pp. 85. 8s. 6d.)

This is a valuable enquiry based upon the study of children in various types of institutions, homes, or schools. One group, for example, were taken in a Home for Illegitimate Children, the occupations of whose parents could be ascertained. Another group came from an institution which provided homes for orphans and other children who had no one to support them: these came from almost all social classes. Other material was afforded by the results gained by the National Institute of Industrial Psychology consisting of a large number of children leaving some half-dozen schools in a poor part of London. Poor Law schools provided further material. A definite, though not large, correlation was found between the intelligence of the children and the social class of their parents, even when they had never seen those parents. Generally speaking it would seem that the correlation would be higher between social class and intelligence if we omit the extreme classes (i.e., the highest and the very lowest), on account of the usually very small numbers that were given for these classes. There is one other point that might be more borne in mind. Is it not likely that in the case, for example, of illegitimate children those in Class A (the highest social group) of the illegitimate children would not be as representative of that highest group to the same extent that the illegitimate children of the lowest groups might be representative of their group.

There was some evidence that environment affected the test results to some extent, though the children taken from bad homes into the so-called British Homes (a fictitious name) showed practically no increase of intelligence from their improved surroundings. The impression the reviewer gets from this excellent piece of work is rather more definitely in favour of the view that there is hereditary transmission of intelligence and a stronger correlation between social class and intelligence than Dr. Lawrence's own cautious conclusion suggests. Undoubtedly we know, through the selection of clever children from elementary schools, that the children from some of the lowest social classes provide examples of a very high degree of intelligence; on the other hand some of the tables given in the last part of this monograph suggest at first sight an absence of intelligence among the higher classes greater than they should when we bear in mind that the representatives of Class A were very small in number.

The exposition of the monograph is remarkably clear and the tables are admirably arranged. Though Dr. Lawrence herself disclaims finality in view of the smallness of some of her numbers, the work should be very suggestive and helpful to later workers supplementing her enquiry. C.W.V.

The Growth of Reason: By FRANK LORIMER. (Kegan Paul, Trench, Trubner and Co., Ltd. pp. 231. 10s. 6d.)

That this book is something more than a study of the development of reason in children is indicated by its sub-title: "A Study of the Role of Verbal Activity in the Growth of the Structure of the Human Mind." The writer's interest, indeed, extends beyond purely psychological aspects: he is a lecturer in social theory and it is in the points of contact between psychology and the development of language and the social functions of thought from the point of view of metaphysics and logic that his interest lies and from which this exposition proceeds. The working out of such border-line problems is of great importance and of no little difficulty. It is, therefore, not surprising if one who is primarily a student of psychology finds the book not very satisfactory from a psychological point of view. The critical and fundamental Chapter III, dealing with the growth of verbal activity in the child, whilst interesting and containing some new points of view, is, on the whole, lacking

in unity. Neither does the chapter indicate very clearly to what the author is leading. Nearly all the material, incidentally, is second hand. There follow chapters on symbolism and meaning, on syntax and abstraction, and these are of special interest as bringing the study of child thought into contact with the study of the grammatical and more logical approach to the study of language. The further exposition of the development of thought in the next chapter includes some reference to Piaget's work and gives the summary of the main factors in the growth of reason. Here, and in the following more philosophical chapters, one feels frequently that the author is expressing in unusual language and somewhat elaborate sentences what could easily be put much more simply. Nevertheless, in view of the necessary difficulties involved in such border-line studies, one feels that this work by Mr. Lorimer is a definite contribution to the study of thought.

The Direct Contribution of Educational Psychology to Teacher Training.
(The University of Chicago Press. pp. 154. 7s. 6d.)

This is the twentieth Year Book of the National Society of College Teachers of Education. It consists of contributions by eleven writers dealing with various aspects of the main topic. One of these refers to the selection of entrants to "Teacher Training" courses. It reveals that this is as acute a problem still in the United States as it is in Great Britain. Professor Gates deals with the place of educational psychology in a general way, in particular dealing with some criticisms and giving a discussion of several different points of view as to the type of psychology which should be given and the stress given to various aspects. An interesting topic is that of Chapter V by F. D. Brooks on "Educational Psychology as Cultural or Functional." The later chapters give some figures showing which courses in the Training College or University were thought to have been most useful by students after they had had some years' experience. Among 114 old students of the University of Kansas the great majority found educational psychology or educational measurements most useful, very few mentioned history of education as the most useful, and the great majority would have liked more time devoted to educational psychology. From another normal school somewhat similar results appear. Here observation of practice teaching was included in the questionnaire and that was placed somewhat before psychology, but not strikingly so. The Report concludes with an extensive bibliography.

The Economy and Technique of Learning: By WM. F. BOOK. (London, D. C. Heath and Co., through G. G. Harrap and Co., Ltd. pp. 534. 10s. 6d. net.)

The book opens with a short section on the "General Nature of the Learning Process," followed by a section devoted to "When and Why Learning Occurs." Having thus dealt with some of the fundamental questions involved the author proceeds to discuss at greater length "How Learning takes place," and "Levels on which Learning may take place." The concluding portion of the book deals very thoroughly with the question of "How to make learning most economical and efficient."

Most students of educational psychology will accept Prof. Book's main assumptions: that educational psychology can be studied with profit only by those who have previously undergone a course of training in psychology; that the educational process is essentially based upon a full understanding of the learning process; and that the very large number of important investigations in relation to the learning process during the last thirty-five years needs careful examination and interpretation.

Prof. Book's volume endeavours to justify this third position, and he has succeeded in summarizing and criticizing many of these important studies. The volume is a useful summary of this important division of educational psychology, and will be welcomed by interested students. There are some important omissions, but, on the whole, it is a very competent work by one who has himself contributed so much to the fuller understanding of the "Technique of Learning." E.C.C.

The Psychology of Character: By RUDOLF ALLERS, M.D. (Sheed and Ward. pp. 383. 16s.)

Dr. Allers is Reader in Psychology at the University of Vienna, and is in general a disciple of Alfred Adler. He is also a Catholic, but it would hardly be correct to say that this book is a blend of individual psychology and Catholic views as to character and its development, for it is much more of an independent psychology as to both sides. The dominant line, however, follows to a considerable extent the views of Adler, and the treatment leads up to the view that the religious sanction is the only final and satisfactory solution of the problems of conflict and character. In the end the conclusion that the Catholic Church is the only community that can provide the adequate stimulus towards such final salvation of character—we use the word salvation in its wide sense—does not seem convincing, and indeed the last chapter seems to be rather written for Dr. Allers' Catholic friends to indicate that he has written nothing inconsistent with Catholic doctrine. And this, so far as a non-Catholic can judge, is probably true.

The book is characterized by a tendency to generalize somewhat freely and to make assertions without giving definite evidence. Many of the statements require careful statistical evidence which is not forthcoming. On the other hand, such hypotheses and generalizations are frequently most suggestive, the exposition is clear, and at many points appear ideas helpful in the treatment of the young and in the adult's understanding of himself. A word of commendation should be paid to the translator, Dr. E. B. Strauss.

Psychology Applied: By G. W. Crane. (Chicago, North-western University Press. pp. 586. 4 dollars.)

This volume is in itself an example of "Psychology Applied," for it is extremely well produced on thick smooth paper, attractively printed, and written in a bright interesting manner. The range of topics discussed is very wide, from "Increasing Human Efficiency" to "Individual and Sex Differences," from "The Psychology of Improving your Personality" to "The Psychology of Music and Morale." The writer has a sound knowledge of his subject and has introduced his readers to several unsuspected applications of psychology. He owes much to the labours and investigations of Prof. Will Scott, but he has read widely in his subject and has the facility of writing easily and appositely. Each chapter is completed by a very full list of references.

Page headings such as "Coaxing and Clubbing," "Hitting the Bull's Eye with your Appeals," may have "selling value." Very dogmatic statements and "Axioms for the Salesman" may "increase sales." The reader will find much to interest him in this book, much to amuse him, and also many presentations which will not be very easily accepted. E.C.C.

Child Psychology: By BUFORD J. JOHNSON. (Bailliere, Tindall and Cox, 7-8, Henrietta Street, Covent Garden, London, W.C.2. pp. 439. 23s.)

This volume is largely a survey of a considerable number of experimental studies dealing with child psychology. It begins with a study of periods of growth and the learning process, followed by a treatment of locomotion, manipulation and speech. Later chapters deal with attention, perception, thought, emotion, social behaviour, and individual differences. One gets the impression that the author is primarily interested in those psychological matters which are closely related to questions of physical growth and capacity. The amount of material surveyed is very considerable and the book should prove a useful guide to the advanced student who wishes to have brief résumés of the contributions of both major and minor writers on various aspects of child psychology. The position is, however, far from clear, and indeed the English of the book sometimes suggest that the material has been rather hurriedly put together and inadequately revised. The book includes a considerable number of very useful tables, but these again would be more useful still if their titles had been more explicit.

The Psychology of High School Discipline: By R. W. PRINGLE. (London G. G. Harrap and Co., Ltd. pp. 362. 7s. 6d. net.)

This is the third volume on "The Psychology of the Adolescent" that the Principal of the University High School at Illinois has written. The first two, "Adolescence and High School Problems" and "Methods with Adolescents," reached a high standard, which is well maintained by this "application of psychology to the problems of adolescence by interpreting its latest findings in relation to the conduct control of high school pupils." The author is critical of the older conceptions of discipline, and points out that essentially one is concerned with "understanding the individual involved and must take into account the conditions as they arise." So that he sets out to establish the psychological basis; then he gives suggestions for the application of these psychological principles to specific situations.

The "Psychology of Conduct" is discussed under the chapter headings, "The Endocrine Glands," "Instincts and Impulses," "Habits," "The Will," and "The Group." In this section the writer deals with most of the relevant topics satisfactorily and suggestively. In the second section interesting chapters deal with "Causes of Disorder," "Class Control through Subject Matter," and "Punishments and other means of control."

On the whole the author is to be complimented on giving to those who are directly concerned with the education of the adolescent another interesting and helpful book.

Psychology, a Study of Mental Life: By ROBERT WOODWORTH. Ninth Edition. (Methuen and Co., Ltd. pp. 590. 8s. 6d.)

In this last edition of this well-known text-book the main changes consist in the re-arrangement of material. The more general and familiar topics, such as intelligence and memory, are placed at the beginning, while the nervous system is "reserved till near the end in the hope that it will mean more to the student after he has acquired a stock of psychological knowledge to be tied up with physiology" (page 3, new preface). This in itself is a delightful comment upon the contention that physiology prepares the way for the understanding of psychology. Even now, however, it is perhaps characteristic of the book that while there is no reference in the index to "repression" there are two references to "kidneys."

The book was always a most readable one and the re-arrangement has certainly improved it. Perhaps the main values of Professor Woodworth's book are still first that he writes in an easy style, sometimes perhaps, it might be thought too colloquial (for example that Freud "would not O.K." his theory of dreams), and second that he refuses to be tied down to any particular school of psychology and passes from one to another adopting in each what he finds in it of value.

Taken as a whole the book affords a useful introduction to psychology.

Philosophy of the Sciences: By F. R. TENNANT. (Cambridge University Press. pp. 191. 6s.)

This book comprises the Tarnier Lectures at Trinity College, Cambridge, for the years 1931 and 1932. The sub-title indicates the main problem of the lectures, namely, "the relations between the departments of knowledge." The first lectures deal with the philosophy of the sciences and the relation of the psychology of knowledge to the philosophy of the sciences. Two further lectures deal with the sciences as "interpretations of historical data" and the relations of history to dogmatic theology and to other departments of knowledge. Readers of this journal are likely to be interested in the importance which Dr. Tennant attaches to psychology in connection with the study of philosophy. He maintains that psychology is fundamental to the study of the theory of knowledge and of philosophy generally; in particular he emphasizes the importance of genetic psychology, even in connection with what are usually assumed to be intuitive and self-evident propositions. The book is written with remarkable clarity and should be a most useful introduction to philosophy, especially for those already with some knowledge of psychology. We need hardly add that it forms a valuable adjunct to theological study.

University of Iowa : Studies in Psychology, No. 15.

This volume of psychological monographs is edited by Christian A. Ruckmick in co-operation with Lee Edward Travis. It contains detailed studies of a somewhat original type, such as "Phonophotographic Analysis of the Vocal Disturbance in Stuttering," "An Action Current and Reflex Time Study of Psychiatric and Neurologic Cases," "Graphic Stuttering," by L. G. Fagan; "Some Common Factors in Reading and Speech," "The Remnant Capacities of the Feeble-minded," and a paper on "Causes of Social Maladjustment in Children" in which a large number of cases are analyzed by Herbert D. Williams. All studies but three have some bearing on the problem of stuttering and to that subject particularly this volume is a useful contribution.

Modern Educational Psychology : By B. N. JHA. (The Indian Press, Ltd., Allahabad.)

As Professor Drever writes in his introduction to this interesting book, there are few books which make available for the student of education the great mass of new psychological material which has a direct and important bearing on education and fewer still written from an impartial and scientific point of view.

Mr. Jha's book is an excellent and useful compilation of well-selected, well-presented material, and can be highly commended to training college lecturers and supervisors of students who feel the need of bringing their own psychological knowledge up to date in so far as new psychological material applies to their work. To all students of education it should prove a useful book for reference. As a text-book it will probably appeal mainly to the most able of the students. The author, after fourteen years of association with the training colleges in the United Provinces of India, would no doubt be one of the first to agree that the average student needs more examples, illustrations, and applications than he has been able to include.

The book is attractively produced with large, clear, pleasing type.

Man as Psychology sees him : By E. S. ROBINSON. (New York, The Macmillan Co. pp. 376. 12s. 6d. net.)

This book is one of the interesting popular presentations of psychology by which the general reader is being attracted to-day. But the Professor of Psychology at Yale University is able to write simply, with a very wide knowledge of the modern developments of the subject, and yet be eminently sound and scientific. The general reader will appreciate the careful attention given to his needs and will be rewarded if he reads the book thoughtfully and critically.

The book is divided into two main divisions "Man : comments on his nature," and "Psychology : its aims, its deeds, its follies." The writer does not avoid the many difficulties involved in writing such a book, and in his analysis of the recent developments preserves a keen sense of values, is critical, and leads the reader carefully and systematically through the maze. Many readers also will enjoy the satisfaction of not agreeing with all the conclusions of the author.

Eidetic Imagery : By E. R. JAENSCH ; translated from the Second Edition by OSCAR OESER. (Kegan Paul, Trench, Trubner and Co., Ltd. pp. 134. 7s. 6d.)

This book, which has come into our hands somewhat late for review, is a welcome addition to the International Library of Psychology in that it gives for the first time in English a systematic account of the methods and results of investigations made by Professor Jaensch in reference to eidetic images. The book, however, goes much beyond the exposition of these enquiries and it proceeds to link these up with the study of "types" as indicated by the sub-title: "Typological Methods of Investigation." Professor Jaensch holds that eidetic images are symptoms of wider aspects of personality, and indeed he links his psychological position up also with wider philosophical doctrines. In the later part of the book some who readily acknowledge the extraordinary interest and importance of the discovery of eidetic imagery will find it harder to follow Professor Jaensch, but that does not really detract from the interest and importance of the main topic of the book.

The Mind in Daily Life: By R. D. GILLESPIE, M.D., M.R.C.P., D.P.M.
(Methuen and Co., Ltd. pp. 288. 8s. 6d.)

This book by the Physician for Psychological Medicine at Guy's Hospital is divided into two parts, the first called "The Psychology of the Normal" and the second "Errors in Mental Development." In a book which deals so much with abnormal psychology, including such topics as nervous developments, "naughty children," and a number of problems of maladjustment in adolescence, there is naturally not space for a comprehensive treatment of psychology and the book does not profess to give such. Even in Part I the subjects chosen are those of special interest leading up to the study of abnormality. Some sections even of this part are considerably concerned with abnormal individuals, for example the section on Day Dreams.

The book is admirably written, with great clearness, and the many concrete examples add greatly to the interest. It should be particularly useful to medical students and to teachers who are specially interested in child guidance and the study of so-called "problem" children.

Adolescent Girlhood: By MARY CHADWICK. (Allen and Unwin, 1932. pp. 293.)

This book is a popular exposition of the commoner problems of adolescent girlhood, and contains some valuable practical hints concerning the right treatment of girls during the period of rapid development between childhood and maturity. The author frankly recognizes the physical difficulties of the period and their mental concomitants, and her practical advice concerning the avoidance of both overstrain and over-influence in school life is a salutary (if unwelcome) warning to all those engaged in the higher education of girls and women. Her treatment throughout, however, although occasionally suggestive, tends to be uncritical and unscientific. Broad generalisations are frequently drawn from the scantiest data, and there is seldom any precise reference to authorities (historical, medical, psychological, or educational).

The first section of the work is mainly historical, and deals with the adolescent girl among primitive races, in fairy tales, in the past and in the present. The treatment of such a vast subject could not but be incomplete, but this is no reason why the facts considered should not have been selected on adequate guiding principles. That there is a failure of perspective due to the absence of clear principles of selection will be obvious from one typical illustration. In dealing with the nineteenth century some interesting examples of the samplers worked by girls are included, but there is no reference to the founding of Queen's College, Cheltenham Ladies' College, and the schools of the Girls' Public Day Schools Company, nor to the pioneer work of women like Miss Buss and Miss Beale and Miss Emily Davis on behalf of adolescent girls. Yet this movement for the higher education of girls, even if so far it has been too academic and one-sided, has certainly changed the environment and modified the outlook and perhaps even created some of the problems of modern adolescent girls.

The second and third parts of the book, which deal respectively with the problems of the home life and the school life of adolescent girls, are psychological, and mainly Freudian, in character. The exposition is uncritical and the perspective of the author appears to be unduly influenced by her concentration on pathological cases. It is, of course, true that there are girls with physical disabilities, mother-fixations, G.P.'s, and the rest; there are homes where parents are separated, mothers are jealous of their daughters and fathers betray them; there are women teachers in girls' schools who are unhealthy influences because of their own neurotic condition; but to draw a picture of adolescent girlhood solely from the consideration of such cases is certainly unjustifiable. Whatever may have been true of the Victorian era there can be no doubt that under modern conditions the majority of girls enjoy their work and play and the utilization of their growing powers in home and school. They have their problems of various kinds, but they also have the power to solve them; and it is the resolution and not the avoidance of mental conflicts which really constitutes the growing-up process and which eventually brings its own deep-seated satisfaction.

O.A.W.

The Education of Visually Handicapped Children: By RALPH VICKERS MERRY, Consultant in Child Guidance, Dayton, Ohio. (Oxford University Press, Amen House, Warwick Square, London, E.C.4. pp. 243. 13s. net.)

The education of visually handicapped children is the subject of Vol. 19 of the Harvard Studies in Education, the author being Ralph Vickers Merry, Consultant in Child Guidance, Dayton, Ohio.

The immediate purposes of this volume are: (1) to clear the ground for further research and progress in the elementary education of visually handicapped children, pointing out the most fundamental problems requiring solution and offering suggestions for their investigation; (2) to assist teachers of such children to clarify their educational theories and objectives; (3) to interest research workers from the field of general education in the study of problems peculiar to the visually handicapped.

With this threefold aim the author has given us not a text-book of educational methods but a very able and comprehensive study of a subject presenting many very difficult problems. An attractive characteristic of the book is the moderation shown in advancing theories and in evaluating alternative schemes and methods.

A blind child is defined as one whose vision, after correction, is insufficient to permit his education by visual methods, while a partially seeing child is regarded as one whose vision, after correction, is insufficient to permit him to be educated satisfactorily and with safety in the ordinary school grades but who can make use of special visual methods such as those provided in sight-saving classes.

The first difficulty arises in the consideration of what should be the aims of education, and the author finds little uniformity of ideas among those responsible for the education of these defective children. If education is to equip the individual for complete living, for good citizenship in its widest sense, it seems that in the case of the visually handicapped it must be largely vocational, although the range of occupations should be extended. The object should be to avoid emphasis of the differences of these individuals from the normal but rather to provide means for their normal social development so that eventually they will be absorbed into ordinary society.

An interesting point is the subject of sight-saving classes, or, as they are commonly termed in this country, myope classes. For these schools a special type of classroom and special equipment are advocated, but whatever be the usual school-room in America, the ideal, as here advised for sight-saving purposes, very closely resembles a classroom in an ordinary English elementary school. Most of the children in these classes are suffering from myopia, a disease the cause of which we do not know. In a proportion of cases myopia may be progressive and may lead to grave visual defect or to blindness. There is, however, no certain evidence that myopia is caused, or even aggravated, by school work as such, and it is possible that in progressive cases the greatest good is accomplished by attention to general health and education on the lines of an open-air school.

The value of these sight-saving schools should, it seems, be judged by three criteria: (1) the extent to which they can be proved to conserve vision; (2) the educational achievement of children so taught; (3) the extent to which they may be adjudged to have taught the hygiene of vision, for probably these children incur most of their visual damage when beyond school influence.

All these points are adequately discussed in the present book. We find, too, a very useful survey of the psychological problems peculiar to the blind and the characteristics and attainments requisite in their teachers. A book which should achieve its aim in stimulating thought and which will repay close study.

J.R.M.

Life and the Public Schools: By the Rt. Rev. A. A. DAVID, Bishop of Liverpool. (Alexander Maclehose and Co. pp. x+239. 10s. 6d.)

This book should appeal to a much wider circle than those immediately concerned with the public school. It is the result of the experience and reflection of one who has been head master of two great schools (Rugby and Clifton), and who,

some years after leaving the work of the school, recorded the results of that experience and reflection. It is, we hope, a significant sign of the times that such a head master, who entered on his work without any special training for the work of teaching, and without having thought out a philosophy or psychology of education, should feel the need of doing this for his own satisfaction even after his actual work had been concluded. The ordinary head master, as he says, is so busy with the affairs of his school that "in regard to the philosophy of his work and the ideas that lie behind it he lives very much from hand to mouth." (Preface.)

It is a matter of gratification that Dr. David has not only found time to do this but has done it so courageously and frankly. Here we see the movement of an able mind, involved in the routine of education on traditional lines, slowly turning towards better and more rational ideals and methods.

The book includes chapters dealing with "Subjects, methods, and boys," "Authority, conduct, and character," and, finally, with the religious aspect of education.

The chapters dealing with development of method will, no doubt, seem somewhat commonplace to those whose business it is to deal constantly with modern developments in the teaching of various subjects; but they are remarkable and notable as being the conclusions of a head master in the work of a great school.

Dr. David pays a remarkable testimony to the value of the training of teachers when he says (page 65): "It is certain that had I been trained to teach before my experience began, I should have arrived at something like my present outlook thirty years ago, and might have saved myself and spared my many victims the consequences of mistakes innumerable." He lays his finger upon the chief difficulty in the development and progress of some schools. "On the staff of almost every public school are men who have escaped the cramping influence of the old, and in the face of disapproval and discouragement have not been afraid to maintain and exercise their faith in the new. But the fact remains that the greatest obstacle to the development of teaching in the interest of the taught is to be found in the teachers" (page 65).

The book contains many wise observations, and is, as we should expect, marked by high ideals. It is a valuable contribution to practical matters in education. My only serious criticism is that there is no index.

C.W.V.

The Platoon School in America: By ROSCOE D. CASE. (Stanford University Press, California. English publisher, Humphrey Milford, Oxford University Press. pp. 283 13s. 6d.)

This is a comprehensive account of the Platoon School, a type of organization which is now widely used, though under somewhat varying forms, in the United States of America. The author points out that the Platoon School plan is primarily a method of organization, though it is a development of the Gary plan, and like the Gary plan, has behind it a good deal of the educational philosophy of Dewey.

The Platoon School is divided into two groups called platoons, one platoon dealing with the fundamental subjects in what are called the "home-rooms," roughly equivalent to what in some English schools we should call the "form" classroom; the other platoon is meanwhile engaged with "activity" subjects in special rooms.

The idea is not a new one in America so far as the distinction between the class or form room with a form master, and special rooms for special subjects are concerned; and in England we have of course long been familiar with the organization of schools in which one master takes certain subjects with his class, which goes to special teachers for subjects such as art, music, foreign languages, etc.

After the historical treatment this book deals with the main organization; the material, the staff, the library, the correlation of programmes and projects, and "comparative costs." It will thus be seen that the book is primarily of interest from the point of view of administration and organization rather than that of psychological principles involved in the scheme, though these appear from time to time.

The First Two Years: A Study of Twenty-five Babies: By MARY M. SHIRLEY. (The University of Minnesota Press. pp. 513. \$3.00.)

This is the second volume of Professor Shirley's work which deals with the whole development of infants for the first two years, Vol. I having dealt with postural and locomotor development. Vol. III, dealing with personality manifestations, is still to appear.

In a review of the first volume in this journal I have already indicated the method of study adopted (see Vol. III, page 94). In the present volume Professor Shirley deals, first, with the development of specific behaviour traits, including the beginning of speech, and growth of comprehension. The second and most substantial part of the book deals with the actual psychological examination, and partly with the nature of tests which are given by the experimenter herself. This is, perhaps, the most valuable part of this volume, as it is not subject to the very considerable doubtfulness which attaches to the reports of parents on their children, even when very specific questions are put to them. The special value of the part dealing with the tests lies, it seems to me, in the very concrete and detailed way in which the observations are made. This value does not lie chiefly in the statistical records or tables but in the full report of the very various types of responses made by the infant to the same test, revealing in some cases, for example, that a failure to score in the test in the ordinary routine way is due, not to some defect, but to some positive capacity or quality. Thus one child failed in the ordinary grasping of toys test simply because he was so vivacious and lively and preferred to knock the toys about! This second part of the book occupies nearly 300 pages.

The last part is a more theoretical discussion of considerable interest dealing with persistence in rate of development. Here Professor Shirley makes some very valuable suggestions as to the principles of behaviour development, emphasizing in particular variations in the speed of development of different factors.

The book is further evidence of the importance of a continued observation of the same child over a long period if we are to establish definite principles of development.
C.W.V.

An Introduction to the Computation of Statistics: By SHEPHERD DAWSON. (University of London Press. pp. 192. 10s. 6d. net.)

This book is intended for laboratory workers, whether students of psychology, physiology, biology, medicine, or education. An excellent feature is the care which the author has taken to elucidate the *actual* processes of calculation. In a book of this kind there is no need to give proofs of underlying theorems and the author has wisely followed the lead of Garrett, Holzinger, and others in this respect, and his readers are advised to consult standard treatises for proofs. Occasionally proofs are given but always the meanings of the values calculated are sufficiently indicated as to make the treatment illuminating.

The exercises at the end of each chapter have been selected with admirable judgment and the absence of errors is a sure sign of the arduous nature of its preparation.

Chapter 1 deals with Tabulation; Chapter 2 with Measures of Central Tendency; and Chapter 3 with Measures of Dispersion and Skewness. These chapters form a third of the book and should not prove difficult even to the beginner. Chapter 4 on Sampling forms another third, and Chapter 5, the final chapter, deals with Correlation. Parts of these two chapters, as would be expected, will prove somewhat tough to the weaker brethren. Critics of examinations may not all agree that the two assumptions on page 26 are "quite reasonable," and the name of the author of the tests of musical capacity might have been mentioned on page 31.

When a second edition is demanded perhaps the author will consider the advisability of enlarging it so as to include some mention of tetrad analysis, and also of some useful variations of the methods of calculating correlations to suit particular cases.

The logical arrangement of the material is well conceived. Without a doubt the author has succeeded in his aim and the book should prove exceedingly useful to statistical workers.
L.I. W. J.

Class Grouping in the Primary School: By H. S. WYNDHAM. (Melbourne, Melbourne University Press; London, Macmillan and Co. 6s.)

Defects of Speech in School Children: By H. T. PARKER. (Melbourne, Melbourne University Press, in association with Oxford University Press. 4s.)

These two slight volumes are useful additions to the Educational Research Series which reports the investigations carried out through the Australian Council for Educational Research and with the assistance of grants from that Council. The whole series is a valuable record of useful research.

The former of these two reports an investigation carried out in 1930 and 1931 in the schools of Sydney; the investigator set out to determine the principles underlying class-grouping in the schools; the organization of these class-groups; the results of these; and what changes, if any, in this organization might be advisable and possible. The investigation is very fully reported and some interesting and important recommendations are made, including the increased use of intelligence tests, and "the use of mental age as the major determinant of class-grouping for the central group of the school population."

In H. T. Parker's book we have the results of an investigation into the question of speech defects among the children in the State Schools of Tasmania. Most of the common defects are carefully considered, their frequency and distribution among the school population are clearly presented by charts and statistics, and useful and valuable recommendations are made to attack and solve some of the problems involved.

Applied Psychology for Advertisers: By A. P. BRADDOCK, M.A., B.Sc. (The Library of Advertising, Butterworth and Co., Ltd. pp. xvi+236. 7s. 6d. net.)

This book is a companion volume to the author's "Psychology and Advertising," published in the same series, and in it the psychological principles developed in the earlier work are applied to the practical art of advertising.

The subject matter covers a wide range; thus instinct, humour, beauty, posters, slogans, sky signals, and salesmanship are a few of the twenty-three chapter headings.

The book is written throughout with a well-balanced, detached, scientific outlook, which should form a useful corrective to the sometimes over-exuberant enthusiasm of the professional advertiser or salesman; in addition, it is easy to read, for the text is well paragraphed and the literary style admirable.

The title of the book suggests that its appeal would be only to those engaged in the advertising profession. Those, however, who are interested in an analysis of their own—or others'—weaknesses, should find much pleasure from its perusal, and if to be forewarned is to be forearmed, if a knowledge of one's irrationalities increases one's resistance to the insidious suggestions of the professional advertiser, to that extent does one become a more civilized individual and perhaps at the same time a less poor one.

Whether the General Editor of a Library of Advertising would approve of such a result from his activities is of course open to question! W.G.E.

The Growing Child: A Series of Five Lectures on Child Management.
Published for the Australian Council for Educational Research.
(Melbourne University Press. pp. 72. 2s.)

Lectures to parents ought to combine in due proportion sound advice, simplicity, and spiritual uplift drawn from the better-known poets. This series fulfils the requirements. The lectures on the child in the family, at school, and in the community are followed by two on the importance of habit and the growth of character. The first essay is the best, because it contains the largest amount of thoughtful advice, but the whole series must have been useful and enlightening to the audience for which they were intended. M.S.

Memorandum on the Teaching of Religious Knowledge in Secondary Schools: By THE RELIGIOUS KNOWLEDGE PANEL OF THE ASSOCIATION OF ASSISTANT MISTRESSES. (University of London Press, Ltd. pp. 20. 1s. net.)

This memorandum is based on the conviction that only on the strength of sound learning can loss of faith in the adult (or profitless emotionalism) be combatted. The suggested syllabuses, which include those both for elementary and secondary school age, are well designed to further the aim (stated by the writers) of Scripture teaching in school, viz., to give the pupils "a conception of the Bible as a whole, as being the record of God's gradual revelation of Himself to man;" at the same time they are wide enough to give the individual teacher scope and variety.

The teacher who wishes to improve her qualifications for teaching Scripture is introduced to an excellent reading list and is told where she can buy models and pictures indispensable to the teaching of children at the preparatory stage. Information is given concerning theological degrees and diplomas open to women.

All teachers who care for religious education are advised to read the pamphlet,
M.H.

The Nature of Learning in its relation to the Living System: By GEORGE HUMPHREY. (Kegan Paul, Trench, Trubner and Co. pp. 292. 15s. net.)

No two situations in the world can ever be precisely alike, hence the problem of learning is so complex that it can be dealt with only by assuming the presence in each situation of a sufficient number of elements to enable the detection of some similarity to what has gone before and in a constantly changing world chaos is thus avoided. But there are degrees of power to detect likeness. What is chaos to one creature presents features of a system to another; above all, man is able to pass to the appreciation of abstractions and symbols without bewilderment.

Dr. Humphrey has produced a thesis which sets out the nature of learning in its relation to the living system. The doctrine of Gestalt here appears treated in a philosophic spirit in its specific relation to learning. Amongst other matters the work attempts to correct the tendency towards the simple idea of mere repetition in the learning process. The treatment is for the advanced student, but there are numerous references with an extensive bibliography and the thesis as a whole has attractive features for students of psychology.
A.P.B.

Alcohol and Man: Edited by HAVEN EMERSON, M.D. (The Macmillan Co., New York. pp. 451. 18s.)

This is a useful volume, summarizing a vast amount of recent research into the effects of alcohol. The book is divided into six parts, the first being on the general effect of alcohol; the second on the effects of alcohol on the cell and in heredity. Part III deals with alcohol as a poison and a medicine; Part IV with body resistance and pathology; Part V is psychological, dealing with the effect on conduct and mental condition, and the last part deals with longevity, mortality, and morbidity. The value of the many contributions naturally varies, but generally they are clearly written and the exposition is such as to make the book suitable for the use of the general reader and the psychologist as well as for the professional medical man. The references are very full and the book should prove a useful introduction to more detailed studies by the student of physiology and hygiene.

The statements of individual authors are made on their own responsibility, but, apparently, the whole book has been submitted to the revision not only of the general editor but of a board of associate editors, including on the psychological side Professor Walter R. Miles, of Yale University.

William James Ashley: a Life: By his daughter ANNE ASHLEY. (P. S. King and Son, Ltd., Orchard House, Westminster. pp. 176. 8s. 6d.)

Sir William Ashley occupied an important place in the development of commercial education in this country during the last half century, and this well-written and restrained appreciation of his personality and work will be of interest to all concerned with education and particularly with the relation between education and commerce or industry. The chapter contributed by Professor Muirhead deals especially with Ashley's progressive work in the University of Birmingham in connection with the Faculty of Commerce, and with social studies in which he was especially interested. In addition this book has its own value as a study of an energetic, broad-minded and kindly personality.

Diary of a Child's Life: By VILHELM RASMUSSEN. (Gyldendal, London. p.p. 187. 6s.)

This little book is a record of the development of the second child of the author, who wrote his "Child Psychology" and the "Kindergarten Child" mainly on the basis of observations on his eldest child. As diaries of children in their first years by competent observers are rare, we welcome this addition to the study of early child psychology—indeed, this volume goes up to the age of fifteen. Many of the facts are stated with great preciseness, but unfortunately a number are somewhat general and vague for the purposes of genetic psychology, for which it is so important that the exact circumstances of the behaviour of the child should be noted.

Comenius in England: By ROBERT FITZGIBBON YOUNG. (Ox. Univ. Press. pp. 99.)

This is described as "the visit of Jan Amos Komensky (Comenius), the Czech Philosopher and Educationist, to London in 1641-1642; its bearing on the origins of the Royal Society, on the development of the Encyclopædia, and on plans for the higher education of the "Indians of New England and Virginia." With such a sub-title there would seem to be little need for further description of the scope of this volume. Five years ago Mr. Young published a brochure on some phases of Comenius' career that were not widely known, and the book now put before the public contains matter that will amply repay the student who takes an interest in origins and especially in the contacts between great men of the period.

Mr. Young gives ten Documents with his own footnotes and references, in addition to a nine-page introduction. The illustrations are interesting and there is a useful table of dates indicating the development of seeds with whose sowing Comenius had so much to do. A.P.B.

The Effect of Unfamiliar Settings on Problem-Solving: By WILLIAM A. BROWNELL, with the assistance of LORENA B. STRETCH. (Duke University Press, Durham, N.C. pp. 86. 5s.)

This is the first of the Duke University Published Series of Researches in Education. After a review and criticism of earlier attacks on the problem, an interesting and carefully devised experiment is described, in which arithmetic problems were given, dealing with perfectly familiar material, and then problems involving the same number-relationships, but referring to concrete objects of increasingly unfamiliar kind. The conclusion of chief value seems to be that those children who are most successful in dealing with the operations when problem settings are relatively familiar to them, are less successful when the settings are strange to them. The authors raise the problem (and give definite evidence) as to whether the freeing of number concepts from definite imagery may not be hindered by supplying children only with problems dealing with materials which are within their own experience.

The School in English and German Fiction : By W. R. HICKS. (London : The Soncino Press, 1933. pp. 138. 6s. net)

This book should be not only of great interest but of genuine value to students of education in England and Germany. For though, as the author recognizes, the novelist is apt to depict the exceptional and extreme, such sketches have their significance. Dr. Hicks also checks the "facts" as given in the novels by reports of the heads of schools and of other writers in both countries.

The book is well arranged and well documented, with a good bibliography. The English section begins with Dickens and concludes with a chapter on the public school in fiction.

The author wrote the sections on Germany after a "fairly long residence in Germany," where the original materials gathered were presented as a dissertation at the University of Erlanger. They include a chapter on "The Background in Germany" and many paragraphs are of special interest at the present time.

Group Tests for Colour Blindness : By Dr. MARY COLLINS and Professor JAMES DREVER. (University of London Press. 10s. 6d.)

This is a convenient test which can be used for a group of children at the same time. It was prepared for the Scottish Council for Research in Education and should prove a most useful means of giving rapidly a preliminary test for colour blindness to large numbers of children. It is in a handy form with a case well adapted for preserving the diagrams. It is so simple that it could be applied by any teacher without special knowledge as to colour-blindness.

Public Schools : their Failure and their Reform : By L. B. PEKIN. (The Hogarth Press. pp. 224. 7s. 6d.)

This book is by a former teacher in public schools and reveals intimate knowledge of the working of certain types of public schools. It indicates a profound disbelief in some of the main tenets of public school life, particularly its forms of punishment, the fagging system, the segregation of the sexes and the curriculum. Some of the indictments seem overstressed. We cannot agree, for example, with the sweeping assertion that corporal punishment invariably involves humiliation and the desire for revenge. Nor should we be prepared to accept the dogmatic statement that public school masters are, to a large extent, emotionally homosexual. These two assertions illustrate the readiness to generalize which characterizes the book. However, in spite of this, the argument is, on the whole, very trenchant, and the book is admirably written. We expect that Mr. Pekin will make many converts : and however much teachers may disagree with some of the particular conclusions, few could read the book without finding it a stimulant and without a broadening of outlook.

Occupations in Victoria : By G. R. GILES and JOHN R. LYALL. (Melbourne Univ. Press, 1932. pp. 79. 4s.)

A study is recorded in this booklet of the seasonal and annual variations of employment in various industries in Victoria, Australia ; the bearing of the results on vocational guidance is discussed.

The Growth of Freedom in Education : By W. J. MCCALLISTER, M.A., Ph.D., B.Sc. (Constable. 15s.)

We welcome a new edition of this valuable book at a lower price. It is now clearer than ever that Professor McCallister's scholarly treatment, both historical and critical, of the idea of freedom in education will remain for long the standard work on the subject.

FOREIGN JOURNALS.

Zeitschrift für Pädagogische Psychologie, 34 Jahrgang, Nr. 4-5, April-May, 1933.

Wilhelm Arp writes on the conceptions of the State among young people, "Die Auffassungen vom Staat bei Jugendlichen." It is agreed that adolescents are no longer limited by their experience of visible evidence in their environment but can deal intellectually with abstractions and the relations between ideas. Deliberately this material has been collected from proletarian youths in a trade school and without necessarily accepting the idea that their only duty as citizens would be to follow the instructions of upper-class youth. The question reads: "How do you think about the word 'State,' (Woran denkst Du bei dem Worte 'Staat?')". The answers are mainly from apprentices, aged 15+, 16+, 17+, 18+. Occupation of the father is stated, also political affiliation (Socialist, Democratic, etc.). Sample answers are classified, arranged, and elucidated so that the implications of the expressions may be understood. The various ideas of the State, imagined or imaginary, are then displayed—the robber-bandit state, the capitalist-conspiracy state, the law-and-order state, the culture state, the racial state, the unlimited state, the limited state, the social-contract state, the Socialist welfare state, etc.

H.R.

Zeitschrift für Pädagogische Psychologie: Nr. 7-8. July-August, 1933.

Hermann Weil: *Ergebnisse einer Umfrage zur Psychologie der Schullüge*. Here are results of a general inquiry into the practice of lying in schools and the motives for lies. A questionnaire was submitted to 111 boys and 117 girls in the highest forms—Prima and Secunda. The answers in sealed envelopes were collected by scholars, and did not pass through the perusal of the staff. Some 644 examples of lies are discussed. These fall rather readily into classes. Thus "social lies," as for example, to save a comrade, 23 per cent; lies in fear of punishment, 17 per cent; lies of convenience, 10 per cent; bragging, 6 per cent; fear of being ridiculous, 5 per cent; and very rare, 1.2 per cent, are "anti-social lies" tending to bring trouble on another person. The girls give slightly different percentages, their ambitions accounting for 20 per cent of their lies. If in lower classes a boy sometimes lies to the prejudice of his school fellows, in the higher classes the tone is quite different, there is marked loyalty to the class community and lies to save comrades are not regretted. The girls are emphatic that with growth of confidence between teacher and taught fear vanishes. If lies cannot be extirpated they can at least be minimized in a régime of confidence. Verbal discussion of these problems in Prima (Form VI) proved very profitable.

H.R.

Zeitschrift für Pädagogische Psychologie. Nr. 9. September, 1933.

Professor Dr. A. Hoffmann of Erfurt writes on the significance of heredity and the foundations of educational anthropology illuminated by research on twins. Physical measurements are given to show the extreme resemblances in one case of twins and in one case of triplets. The school marks of the twins through eight half-years are also shown in a condensed graphic form which makes clear how they resemble each other in their good, average and bad subjects.

Rudolf Fendler deals with performances in German (or as we might say in English subjects) in arithmetic and the cultural milieu of the school child. Seven hundred and seventy-five children were grouped as 47 children of Akademiker and Lehrer, 160 children of Beamten, 156 children of Gewerbetreibenden and 412 children of Arbeiter. Each group was again classified separately in German and in arithmetic according to whether marks were more than genügend, genügend, or less than genügend. In German the academic group show 81 per cent above satisfactory, the workers' group only 41 per cent. In arithmetic the academic group show only 62 per cent above satisfactory, whilst the labour group reach 56 per cent, and the tradesmen 69 per cent. The conclusion is that performance in arithmetic is more dependent on environment far more than that in German.

to the success of daily work for Akademiker.

The new editor, Professor Oswald Krehl of Göttingen, contributes a leading article on the task of scientific educational psychology in relation to the national state. Under book reviews Professor Krehl deals with the torrent of recent popular works on heredity and eugenics.

H.R.